

Part A - Administrative

WAC 296-96-00500 Scope, purpose, and authority.

This chapter is authorized by chapter 70.87 RCW covering elevators, lifting devices, and moving walks. The purpose of this chapter is to:

- (1) Provide for the safe mechanical and electrical operation, construction, installation, alteration, inspection, relocation, and repair of conveyances; and
- (2) Ensure that all such operation, construction, installation, alteration, inspection, and repair subject to the provisions of this chapter will be reasonably safe to persons and property and in conformity with the provisions of this chapter and the applicable statutes of the State of Washington.

WAC 296-96-00600 What rules apply to your conveyance?

Elevators and other conveyances must comply with the rules adopted by the department that were in effect at the time the conveyance was permitted unless any new rule specifically states that it applies to all elevators, regardless of when the elevator was permitted.

Please note, if the elevator is altered it must comply with all of the applicable rules adopted by the department in effect at the time the conveyance was altered.

WAC 296-96-00650 Which National Elevator Codes and Supplements has the department adopted?

NATIONAL ELEVATOR CODES AND SUPPLEMENTS ADOPTED				
TYPE OF CONVEYANCE	NATIONAL CODE AND SUPPLEMENTS	DATE INSTALLED		COMMENTS
		FROM	TO	
Elevators, Dumbwaiters, Escalators	American Standard Safety Code (ASA) A17.1, 1960	Prior to 11/1/1963		Adopted Standard Part X of ASA applies to all installations in existence prior to 11/1/63.
Elevators, Dumbwaiters, Escalators	American Standard Safety Code (ASA) A17.1, 1960	11/1/1963	12/29/1967	Adopted Standard
Moving Walks	American Safety Association A17.1.13, 1962	11/1/1963	12/29/1967	Adopted Standard

TYPE OF CONVEYANCE	NATIONAL CODE AND SUPPLEMENTS	DATE INSTALLED		COMMENTS
		FROM	TO	
Elevators, Dumbwaiters, Escalators, and Moving Walks	U.S.A. Standards (USAS) USAS A17.1, 1965; Supplements A17.1a, 1967; A17.1b, 1968; A17.1c, 1969;	12/30/1967	2/24/1972	Adopted Standard USAS 1965 includes revision and consolidation of A17.1-1, 1960, A17.1a, 1963, and A17.1-13, 1962. Adopted code and supplements, excluding Appendix E and ANSI 17.1d, 1970.
Elevators, Dumbwaiters, Escalators, and Moving Walks	American National Standard Institute ANSI A17.1, 1971	2/25/1972	6/30/1982	Adopted Standard as amended and revised through 1971.
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1, 1971; A17.1a, 1972	2/25/1972	6/30/1982	Adopted Supplement
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1, 1981	7/1/1982	1/9/1986	Adopted Standard
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1a, 1982	3/1/1984	1/9/1986	Adopted Supplement
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1b, 1983	12/1/1984	1/9/1986	Adopted Supplement, except portable escalators covered by Part VIII of A17.1b, 1983.
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1, 1984	1/10/1986	12/31/1988	Adopted Standard Except Part XIX. After 11/1/1988 Part II, Rule 211.3b was replaced by WAC 296-81-275.
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1a, 1985	1/10/1986	12/31/1988	Adopted Supplement
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1b, 1985; A17.1c, 1986; A17.1d, 1986; and A17.1e, 1987	12/6/1987	12/31/1988	Adopted Supplement

TYPE OF CONVEYANCE	NATIONAL CODE AND SUPPLEMENTS	DATE INSTALLED		COMMENTS
		FROM	TO	
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1, 1987	1/1/1989	12/31/1992	Adopted Standard Except Part XIX and Part II, Rule 211.3b. WAC 296-81-275 replaced Part II, Rule 211.3b.
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1, 1990	1/1/1993	2/28/1995	Adopted Standard Except Part XIX and Part V, Section 513. Chapter 296-94 WAC replaced Part V, Section 513.
Elevators, Dumbwaiters, Escalators, and Moving Walks	ANSI A17.1, 1993	3/1/1995	6/30/1998	Adopted Standard Except Part XIX and Part V, Section 513. Chapter 296-94 WAC replaced Part V, Section 513.
Elevators, Dumbwaiters, Escalators, and Moving Walks	ASME A17.1, 1996	6/30/1998	Current	Adopted Standard Except Part V, Section 513.
<i>Note:</i> Copies of codes and supplements can be obtained from The American Society of Mechanical Engineers, Order Department, 22 Law Drive, Box 2900, Fairfield, New Jersey, 07007-2900 or by visiting www.asme.org .				

WAC 296-96-00700 Chapter definitions.

The following general definitions apply to this chapter:

"ANSI" means the American National Standard Institute.

"ASA" means the American Safety Association.

"ASME" means the American Society of Mechanical Engineers.

"Automobile parking elevator" means an elevator that is located in either a stationary or horizontally moving hoistway and is used exclusively for parking automobiles.

(a) During the parking process, each automobile moves onto or off of the elevator under its own power or by a power driven transfer device into parking spaces or cubicles directly in line with the elevator.

(b) Normally, no person is stationed on any level except the receiving level.

"Belt manlift" means a power-driven endless belt with steps or platforms and handholds used for the transportation of personnel from floor to floor.

"Boat launching elevator" means an elevator that:

(a) Serves a boat launching structure and a beach or water surface; and

(b) Is used for carrying or handling boats in which people ride.

"Casket lift" means a lift that:

(a) Is installed at a mortuary;

(b) Is designed exclusively for carrying caskets;

(c) Moves in guides in basically a vertical direction; and

(d) Serves two or more floors or landings.

"Code" refers to nationally accepted codes (i.e. ASME, ANSI, ASA, and NEC) and/or the Washington Administrative Code.

"Conveyance" means an elevator, escalator, dumbwaiter, belt manlift, automobile parking elevator, moving walk, as well as, other elevating devices defined in this chapter.

"Department" means the department of labor and industries.

"Director" means the director of the department or the director's representative.

"Direct-plunger hydraulic elevator" means a hydraulic elevator with a plunger or cylinder attached to the car frame or platform.

"Dumbwaiter" means a hoisting and lowering mechanism equipped with a car that:

- (a) Moves in guides in substantially a vertical direction;
- (b) Has a floor area that does not exceed 9 square feet;
- (c) Has an inside height that does not exceed 4 feet;
- (d) Has a capacity that does not exceed 500 pounds; and
- (e) Is used exclusively for carrying materials.

"Electric elevator" means an elevator powered by an electric driving machine.

"Electro-hydraulic elevator" means a direct-plunger elevator where a pump driven by an electric motor pumps liquid, under pressure, directly into the cylinder.

"Elevator" means:

- (1) A hoisting or lowering machine;
- (2) Equipped with a car or platform that moves in guides; and
- (3) Services two or more floors or landings of a building or structure.

"Escalator" means a power-driven, inclined, continuous stairway used for raising and lowering passengers.

"Freight elevator" means an elevator:

- (a) Used primarily for carrying freight; and
- (b) Whose passengers are limited to the operator, people needed to load and unload freight, and other employees approved by the department.

"Hand elevator" means an elevator where manual energy moves the car.

"Hydraulic elevator" means an elevator powered by a plunger or piston moved by pressurized liquid in a cylinder.

"Inclined elevator" means an elevator that travels at an inclined angle of 70 degrees or less from the horizontal.

"Inspector" means a department elevator inspector or an inspector in a municipality with an elevator ordinance in effect according to RCW 70.87.200.

"Limited-use/limited-application elevator (LULA)" means a powered passenger elevator whose use and application is limited by size, capacity, speed, and rise. It is principally used for vertically transporting people with physical disabilities.

"Maintained-pressure hydraulic elevator" means a direct-plunger elevator where pressurized liquid is always available for transfer into the cylinder.

"Material hoist" means a hoist that is:

- (a) Not part of a permanent structure;
- (b) Installed inside or outside buildings during construction, alteration, or demolition;
- (c) Used to raise or lower materials associated with the building project; and

"Material lift" means a lift that is not part of a conveying system and is:

- (a) Permanently installed in a commercial or industrial area;
- (b) Not accessible to the general public or intended to be operated by the general public.

"Moving walk" means a passenger-carrying device on which:

- (a) Passengers stand or walk; and
- (b) The carrying surface remains parallel to its direction of motion.

"Multi-deck elevator" means an elevator having two or more compartments located one immediately above the other.

"NEC" means the National Electrical Code.

"Observation elevator" means an elevator designed for exterior viewing by passengers while the car is traveling.

"One-man capacity manlift" means a single passenger device that:

- (a) Is either hand-powered counterweighted or electric-powered;
- (b) Travels vertically in guides; and
- (c) Serves two or more landings.

"Owner" means any person having title to or control of a conveyance, as guardian, trustee, lessee, or otherwise.

"Passenger elevator" means an elevator used to carry passengers but may also be used to carry freight or materials if the load does not exceed the capacity of the elevator.

"Permit" means a permit issued by the department to construct, alter, install, relocate, or operate a conveyance.

"Person" means an individual, this state, a political subdivision of this state, any public or private corporation, any firm, or any other entity.

"Personnel hoist" means a hoist that is:

- (a) Not part of a permanent structure;
- (b) Installed inside or outside buildings during construction, alteration or demolition;
- (c) Used to raise or lower workers and other persons associated with the building project; and
- (d) Used for the transportation of materials when necessary.

"Power elevator" means an elevator using energy, other than gravitational or manual energy, to move the car.

"Private residence conveyance" means a conveyance installed in or on the premises of a single-family dwelling and used to transport people or property from one elevation to another.

"Rack and pinion elevator" means a power elevator, with or without counterweights, supported, raised and lowered by a motor(s) driving a pinion(s) on a stationary rack mounted in the hoistway.

"Rooftop elevator" means a powered passenger or freight elevator that operates between a roof level landing and a landing below and opens, horizontally, onto a building roof.

"Roped hydraulic elevator" means a hydraulic elevator with its plunger or piston coupled to the car by wire ropes and sheaves.

"Screw column elevator" means a powered elevator with a non-counterweighted car supported, raised and lowered by a screw thread.

"Sidewalk elevator" means a freight elevator that operates between the sidewalk or other areas outside a building and the building floor levels below; and

- (a) At its upper travel limit, has no landing opening into the building; and
- (b) Is not used to carry automobiles.

"Special purpose personnel elevator" means an elevator that is limited in size, capacity, and speed and is:

- (a) Permanently installed in grain elevators, radio antennas, bridge towers, underground facilities, dams, power plants and similar structures; and

(b) Used to vertically transport authorized personnel, their tools and equipment.

"Stairway chair lift" means a lift that travels in an inclined direction and is designed for use by disabled persons.

"USAS" means the U.S.A. Standards.

"WAC" means the Washington Administrative Code.

"Wheelchair lift" means a lift that travels in a vertical or inclined direction and is designed for use by wheelchair users.

"Workmen's construction elevator" means a permanent elevator used temporarily during construction for personnel and materials.

WAC 296-96-00800 Advisory committee on conveyances.

The purpose of the advisory committee is to advise the department on the adoption of regulations that apply to conveyances; methods of enforcing and administering the elevator law, chapter 70.87 RCW; and matters of concern to the conveyance industry and to the individual installers, owners and users of conveyances. The advisory committee consists of five persons appointed by the director of the department with the advice of the chief of the elevator section. The committee members shall serve four years.

The committee shall meet on the third Tuesday of February, May, August, and November of each year, and at other times at the discretion of the chief of the elevator section. The committee members shall serve without per diem or travel expenses.

The chief of the elevator section shall be the secretary for the advisory committee.

Part B - Regulations and Fees for All Elevators, Dumbwaiters, Escalators and Other Conveyances

NOTE: Total fees include the sum of the permit cost plus plan check fees.

WAC 296-96-01000 What is the permit process for conveyances?

- (1) Prior to the start of the construction, alteration, or relocation, of all conveyances (this includes both private residence and commercial conveyances) your plan must be approved by the department. See WAC 296-96-01030.
- (2) Prior to construction, alteration, or relocation of any conveyance, you must get an installation permit from the department. See WAC 296-96-01010 and 296-96-01015.
- (3) Your conveyance must be inspected upon completion of the construction, alteration, or relocation. See WAC 296-96-01035.
- (4) You must obtain and renew an annual operating permit for each conveyance that you own, except for residential conveyances. See WAC 296-96-01065.
- (5) After initial purchase and inspection private residence conveyance(s) do not require an annual permit. However, annual inspections may be conducted upon request. See WAC 296-96-01065 for the associated fees.

WAC 296-96-01005 When do I need a permit?

- (1) You must obtain a permit from the department before you begin constructing, altering or relocating any conveyance as described in the definitions for this chapter. To obtain your permit, you need to complete the permit application and pay the appropriate fee. Once your application is approved, a permit will be issued and you may begin work on your project.
- (2) Construction and alteration permits are valid for one year from the date of issue; however, permits may be renewed if you:
 - (a) Apply for a renewal permit before your current permit expires;
 - (b) The department approves your request for a renewal permit;
 - (c) You pay a one-dollar renewal fee to the department for each permit you renew; and
 - (d) If your permit has expired you must reapply for a new permit.
- (3) You are not required to obtain permits and pay fees for repairs and replacement associated with normal functions and necessary maintenance done with parts of equivalent materials, strength and design; or for any conveyance exempted by RCW 70.87.200.

WAC 296-96-01010 What are the permit fees for conveyances other than material lifts and hoists and how are they calculated? Permit fees are based on the total cost of the conveyance and labor to install. The following permit fees apply to the construction, alteration, or relocation of all conveyances except for material lifts:

TOTAL COST OF CONVEYANCE	FEE
\$250 to and including \$1,000	\$ 31.30
\$1,001 to and including \$15,000	
For the first \$1,001	44.20
Each additional \$1,000 or fraction thereof	8.70

\$15,001 to and including \$100,000	
For first \$15,001	169.90
For each additional \$1,000 or fraction thereof	5.60
OVER \$100,001	
For the first \$100,001	714.40
For each additional \$1,000 or fraction thereof	4.60

WAC 296-96-01015 What are the permit fees for material lifts and how are they calculated?

Permit fees are based on the total cost of the material lift and labor to install). The following fees apply to construction, alteration, or relocation of material lifts:

TOTAL COST OF MATERIAL LIFT	FEE
\$250 to and including \$1,000	\$28.00
\$1,001 to and including \$15,000	
For the first \$1,001	39.25
Each additional \$1,000 or fraction thereof	7.75
\$15,001 to and including \$100,000	
For first \$15,001	150.25
For each additional \$1,000 or fraction thereof	5.00
OVER \$100,001	
For the first \$100,001	631.50
For each additional \$1,000 or fraction thereof	4.00

WAC 296-96-01025 What is the permit fee for personnel and material hoists?

The fee for each personnel hoist or material hoist installation is \$101.75

WAC 296-96-01027 Are initial installation permit fees refundable? Your initial installation permit fees are refundable minus a processing fee unless your permits have expired. No refunds will be issued for expired permits. All requests for refunds must be submitted in writing to the elevator section and must identify the specific permits for which the refunds are requested.

The processing fee for a refund is \$26.70

WAC 296-96-01030 What is the process for installation and alteration plan approval?

Prior to the start of construction, you must submit to the department for approval two copies of plans for new installations or major alterations. To be approved, the plan must comply with the latest adopted edition of the American Society of Mechanical Engineers (ASME) A17.1, the National Electrical Code (NEC) and applicable Washington Administrative Codes (WAC). In addition, the plans must include all information necessary in determining whether each installation/alteration complies with all applicable codes. You must keep a copy of the approved plan on the job site until the department has witnessed all acceptance tests. Any alterations to the approved plan must be submitted to the department for approval before a final inspection will be conducted. The nonrefundable fees for reviewing your plans are:

For each installation/major alteration \$22.80

If more than two sets of plans are submitted, the fee for each additional set \$22.80

WAC 296-96-01035 Are there inspection fees? The initial inspection of a conveyance or for the initial inspection of construction, alteration or relocation of a conveyance is included with your permit fee. Once the department has approved the conveyance you will be issued a permit that is valid for 30-days. Prior to the expiration of the 30-day permit the application for an annual operating permit and the appropriate fees must be paid to the department. Once the department has received the appropriate fees and application you will be issued your first annual operating permit. You are required to renew your annual operating permit yearly.

The following exceptions do require a fee:

RE-INSPECTION	FEE
If a conveyance does not pass an initial inspection and a second inspection is required, the fee for each conveyance re-inspected is	\$81.00
If any additional re-inspections are required, the fee for each conveyance re-inspected	\$104.60

The department may waive re-inspection fees.

WAC 296-96-01040 What is the fee for testing and inspecting regular elevators used as temporary personnel elevators?

- (1) The fee for the inspecting and testing of regular elevators used as temporary personnel elevators is \$69.40, in addition to any other fees required in this chapter. This fee purchases a 30-day temporary use permit that may be renewed at the department's discretion.
- (2) When this temporary use permit is purchased, a notice declaring that the equipment has not received final approval from the department must be conspicuously posted on the elevator.

WAC 296-96-01045 What are the inspection requirements and fees for conveyances in private residences?

- (1) Chapter 70.87 RCW requires the department to inspect all new, altered or relocated conveyances operated exclusively for single-family use in private residences. Prior to inspection, you must complete a permit application as described in WAC 296-96-01005 and pay the appropriate fee listed in WAC 296-96-01010.
- (2) Chapter 70.87 RCW allows the department to inspect conveyances operated exclusively for single-family use in private residences when the department is investigating an accident or an alleged or apparent violation of the statute or these rules.
- (3) No annual inspection and operating permit is required for a private residence conveyance operated exclusively for single-family use unless the owner requests it. When an owner requests an inspection and an annual operating permit, the following fee must be paid prior to an inspection:

TYPE OF CONVEYANCE	FEE
Each inclined stairway chair lift in private residence	\$ 16.90
Each inclined wheel chair lift in a private residence	22.80
Each vertical wheel chair lift in a private residence	28.80
Each dumbwaiter in a private residence	22.80
Each inclined elevator at a private residence	81.00
Each private residence elevator	52.20
Duplication of a lost, damaged or stolen operating permit	5.10

WAC 296-96-01050 How do I get a supplemental inspection?

Any person, firm, corporation or governmental agency can request a supplemental inspection from the department by paying a fee of \$299.80 per day plus the standard per diem and mileage allowance granted to department inspectors.

WAC 296-96-01055 Are technical services available and what is the fee?

You may request elevator field technical services from the department by paying a fee of \$57.80 per hour plus the standard per diem and mileage allowance granted to department inspectors. These field technical services may include code evaluation, code consultation, plan examination, code interpretation and clarification of technical data relating to the application of the department's conveyance rules. Field technical services do not include inspections.

WAC 296-96-01060 Can I request an after hours inspection and what is the fee?

You may request an inspection outside of normal business hours, which are 7:00 a.m. to 5:00 p.m., if an inspector is available and the inspection is authorized by the department. The minimum fee for an after-hours inspection is \$72.70 per hour plus the standard per diem and mileage allowance granted to department inspectors. This fee is in addition to any other fees required for your project.

WAC 296-96-01065 What are the annual operating permits fees?

An annual operating permit will be issued to you upon payment of the appropriate fee:

TYPE OF CONVEYANCE	FEE
Each hydraulic elevator	\$ 80.90
Each roped-hydraulic elevator	104.60
plus for each hoistway opening in excess of two	7.90
Each cable elevator	104.60
plus for each hoistway opening in excess of two	7.90
Each cable elevator traveling more than 25 feet without an opening--for each 25 foot traveled	11.00
Each limited-use/limited-application (LULA) elevator	80.90
Each escalator	80.90
Each dumbwaiter in other than a private residence	52.20
Each material lift	69.40
Each incline elevator in other than a private residence	104.60
Each belt manlift	80.90
Each stair lift in other than a private residence	52.20
Each wheel chair lift in other than a private residence	52.20
Each personnel hoist	80.90

Each grain elevator personnel lift	80.90
Each material hoist	80.90
Each special purpose elevator	80.90
Each private residence elevator installed in other than a private residence	80.90
Each casket lift	80.90
Each sidewalk freight elevator	80.90
Each hand-powered manlift or freight elevator	52.20
Each boat launching elevator	80.90
Each auto parking elevator	80.90
Each moving walk	80.90
Duplication of a damaged, lost or stolen operating permit	5.10

WAC 296-96-01070 Are there penalties? (1) Any installer, owner or operator of a conveyance who violates a provision of chapter 70.87 RCW or these rules shall be subject to the following civil penalties:

- (a) Operation of a conveyance
without a permit:

First violation	\$150.00
Second violation	300.00
Each additional violation	500.00
- (b) Installation of a conveyance
without a permit:

First violation	\$150.00
Second violation	300.00
Each additional violation	500.00
- (c) Relocation of a conveyance
without a permit:

First violation	\$150.00
Second violation	300.00
Each additional violation	500.00

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| (d) | Alteration of a conveyance without a permit: | |
| | First violation | \$150.00 |
| | Second violation | 300.00 |
| | Each additional violation | 500.00 |
| (e) | Operation of a conveyance for which the department has issued a red tag or has revoked or suspended an operating permit: | \$500.00 |
| (f) | Failure to comply with a correction notice: | |
| | Within 90 days | \$100.00 |
| | Between 91 and 180 days | 250.00 |
| | Between 181 and 270 days | 400.00 |
| | Between 271 and 360 days | 500.00 |
| | <i>Note:</i> Penalties cumulate | |
| (g) | Failure to submit official written notification that all corrections have been completed: | |
| | Within 90 days | \$100.00 |
| | Between 91 and 180 days | 250.00 |
| | Between 181 and 270 days | 400.00 |
| | Between 271 and 360 days | 500.00 |
| | <i>Note:</i> Penalties cumulate | |

(2) A violation as described in subsection (1)(a), (b), (c), and (d) of this section will be a "second" or "additional" violation only if it occurs within one year of the first violation.

(3) The department must use certified mail to notify the installer, owner, or operator of a violation of chapter 70.87 RCW, or these rules.

WAC 296-96-01080 How do you appeal a notice of violation?

A person who contests a notice of violation issued by the department may request a hearing. The request for a hearing must be:

- (1) In writing;
- (2) Accompanied by a certified or cashier's check, payable to the department, for \$200.00; and
- (3) Postmarked or received by the department within 15 days after the person receives the department's violation notice.

Part C - Regulations for New and Altered Elevators and Lifting Devices

NOTE: The following rules set the minimum standard for all new installations and, where applicable, alterations.

WAC 296-96-02240 Where is a shut-off valve required for hydraulic elevators?

Two shut-off valves may be required.

- (1) ASME requires that a shut-off valve be installed in the machine room.
- (2) When the pit is lower than the machine a shut-off valve must be installed in the pit. A separate shut-off valve is not required in the pit for hydraulic elevators equipped with a safety/rupture valve that rotates no more than 180 degrees to stop the flow of hydraulic fluid and has a safety shut-off handle capable of being grasped.

WAC 296-96-02275 What are the requirements for Phase I recall?

Devices for deactivating recall must be in the line of sight of the elevator; be secure from tampering; and must be accessible to fire, inspection, and elevator service personnel only. Owner-designated patient express and emergency hospital service elevators may have a manual control in the car for use by authorized patient care personnel. When activated, it shall preclude Phase I recall.

EXCEPTION: Limited use/limited application (LULA), special purpose, and residential elevators are exempt from the Phase I recall requirement.

WAC 296-96-02277 How does the department enforce ASME requirements for sprinklers, smoke detectors, and heat detectors in hoistways and machine rooms?

ASME A17.1-102.2 (c)3 states: "Means shall be provided to automatically disconnect the mainline power supply to the affected elevator prior to the application of water."

- (1) The department enforces this rule as follows:
 - (a) When sprinkler systems are installed in an elevator hoistway, fixed temperature heat detectors, set only at 135 F, must be located at the top of the hoistway. If sprinklers are installed in the machine room, the same rule applies to heat detectors in the machine room. If you install heat detectors, you must also install a smoke detector for elevator recall. The purpose of these heat detectors is to automatically disconnect mainline power to the elevator before water flows from any sprinkler associated with the elevator system.
 - (b) Smoke detectors at the top of the hoistway shall not recall the elevator to the bottom landing.
 - (c) Heat detectors must be:
 - (i) Located near each sprinkler head as required by NFPA 13;
 - (ii) Considered only as an auxiliary function of elevator equipment;
 - (iii) Identified as "elevator controls only - DO NOT TEST"; and
 - (iv) Ceiling mounted. However, pit detectors, if installed, may only be used as a signaling device and wall-mounted if they are so designed.
 - (v) Heat detectors are not required in pits provided the automatic sprinkler heads are installed in such a way that the water spray pattern does not spray higher than three feet above the pit floor with a spray pattern directed level and down. The shunt trip disconnect must be installed in the machine room or machinery space and it must be easily identifiable.

(d) Power for the automatic disconnect control circuit must be derived from the load side of the elevator power main disconnecting means or from a 120 volt separate branch circuit. Circuit location must be identified on or next to the elevator disconnects. If a 120 volt separate branch circuit is used an illuminated visual device must be installed in the machine room adjacent to each elevator's disconnect. The purpose of this visual device is to indicate that power is available to the shunt trip activation mechanism.

(e) All electrical equipment and wiring associated with shunt trip devices must conform to the applicable ANSI/NFPA 70.

(f) The department does not require sprinkler shut-off valves. However, where they are installed, they must be located in an accessible place outside the hoistway, machine room or machinery space with their handles placed at no more than 6 feet above the floor.

(g) Emergency return units must be disabled when the shunt trip is activated.

(2) The department must approve alternative methods used to achieve ASME A17.1 – 102.2

(c)(3) prior to installation.

WAC 296-96-02278 Are keys required to be onsite?

Yes. The keys to the machine room that are necessary to operate the elevator must be readily available to authorized personnel.

NOTE: The department recommends the use of a locked key retainer box in the elevator lobby at the designated level above the hall buttons or by machine room doors at no more than 6 feet above the floor. This key retainer box should be:

- Readily accessible to authorized personnel;
- Clearly labeled "Elevator"; and
- Equipped with a 1-inch cylinder cam lock key #39504.

The department further recommends that:

- Keys for access to elevator machine rooms and for operating elevator equipment are tagged and kept in the key box.
- The key box contains all keys necessary for inspection of the elevator.
- Mechanical hoistway access devices are located in the machine room.

WAC 296-96-02280 Can pipes and ducts be installed above a machine room? Electric conduit, pipes, and ducts may be installed in the upper space ("upper space" is defined as the space above the fire-rated ceiling) of the elevator machine room as long as they are installed above the required seven-foot clearance and they do not interfere with the elevator equipment which also must be installed to allow a seven-foot head clearance.

(1) Straight through runs of electrical conduit without junction boxes may be installed in this space.

(2) Pipes and ducts conveying gases, vapor, or liquids may be installed in the space above the machine room provided they are encased in a noncombustible secondary pipe without joints, or a moisture barrier without penetration.

WAC 296-96-02281 What is required for emergency escape hatches?

Emergency escape hatches must be hinged and secured from the car top so that the cover opens from the top of the car only.

WAC 296-96-02300 Are self-leveling devices required?

Automatic elevators must be equipped with a self-leveling device that:

- (1) Operates automatically;
- (2) Stops the car at each floor landing within a tolerance of plus or minus 1/2 inch under normal loading and unloading conditions;
- (3) Functions independently of the car's operating device;
- (4) Corrects for over-travel and under-travel; and
- (5) Always maintains the car within a tolerance of plus or minus 1/2 inch with the landing regardless of load.

WAC 296-96-02306 Is a door reopening device required on automatic-closing car doors?

- (1) If an elevator car door closes automatically, a door reopening device must be installed that:
 - (a) Stops and reopens the car door and the adjacent hoistway door whenever the car door is obstructed while closing;
 - (b) Is activated by a sensor, not physical contact;
 - (c) Is capable of sensing an object or a person in the path of the closing car door; and
- (2) The sensing device can be located along the entire edge of the door. When used with a manually operated device (safety edge), a minimum of two sensing devices must be installed between 5 and 29 inches above the floor.

WAC 296-96-02310 What is the minimum acceptable initial transfer time for an elevator door?

"Initial transfer time" refers to the period of time between an elevator car receiving a call for service and when the car door begins to close. The minimum acceptable initial transfer time for an elevator is:

- (1) For HALL CALLS, minimum acceptable initial transfer time is based upon the distance between a point in the center of the corridor or lobby (maximum 5 feet) that is directly opposite the farthest hall button controlling the car and the centerline of the hoist-way entrance. Minimum acceptable times for specific distances are:
 - (a) 0-5 feet: 4 seconds;
 - (b) 10 feet: 7 seconds;
 - (c) 15 feet: 10 seconds; and
 - (d) 20 feet: 13 seconds.
- (2) For CAR CALLS, the minimum acceptable initial transfer time for doors to remain fully open is 3 seconds.

WAC 296-96-02315 What are the structural requirements for car interiors?

- (1) All car interiors must be constructed to allow wheelchair users to enter the car, to maneuver within reach of the control panel and to exit the car.
- (2) Minimum door width must be 36 inches.
- (3) Minimum cab depth:
 - (a) From the rear wall to the return panel must be 51 inches; and

- (b) From the rear wall to the inside face of the cab door must be 54 inches.
- (4) For cabs with side-opening doors, the minimum cab width is 68 inches;
- (5) For cabs with center-opening doors, the minimum cab width is 80 inches; and
- (6) Maximum clearance between a car platform sill and the edge of a hoistway landing sill must be 1 1/4 inch.

EXCEPTION 1: Elevators located in school buildings or other buildings specifically identified by local authorities may have a minimum clear distance between walls or between a wall and the door, including the return panel, of 54 inches, and a minimum distance from the wall to the return panel of 51 inches.

EXCEPTION 2: LULA, special purpose, and residential elevators must meet the specifications in ASME A17.1 pertaining to car size.

WAC 296-96-02320 What is required for car controls?

- (1) The following requirements apply to the location of car controls:
 - (a) Upon entering an elevator, at least one set of controls must be readily accessible from a wheelchair;
 - (b) The centerline of the alarm button and emergency stop switch must be 35 inches;
 - (c) Where a side approach is used, the highest floor buttons must be no higher than 54 inches from the floor;
 - (d) Where a forward approach is used, the highest floor buttons must be no higher than 48 inches from the floor;
 - (e) Emergency controls must be grouped together at the bottom of the control panel and centered at 35 inches;
 - (f) Controls unessential to the elevator's operation may be located in a convenient place.
- (2) The following requirements apply to the construction of control panels:
 - (a) Raised or flush floor registration buttons, exclusive of the panel border, must be at least 3/4 inch and arranged from left to right in ascending order.
 - (b) When pushed, the depth of flush buttons must not exceed 3/8 inch.
 - (c) Indicator lights must be installed to show each call registered and they must extinguish when a call is answered.
 - (d) All markings must be located to the left of and adjacent to the car controls on a contrasting color background.
 - (e) All letters or numbers must be at least 5/8 inches high and must be raised .030 of an inch.
 - (f) Braille must be used to identify all control buttons. Permanently attached plates are acceptable.
 - (g) Standard ASME A17.1 symbols must be used to identify essential controls.

WAC 296-96-02325 What are the location and operation requirements for car position indicators in the car?

- (1) A visual car position indicator must be located either above the car control panel or above the car door.
- (2) As a car passes or stops at a floor, the corresponding floor numbers must light up and a signal must sound.
- (3) All numerals must be at least 1/2 inch high.

- (4) All audible signals must be at least 20 decibels with a frequency no higher than 1500 Hz.
- (5) The automatic announcement of a floor number may be substituted for an audible signal.

WAC 296-96-02330 What is required for installation and operation of emergency communication systems?

Every elevator must contain an emergency two-way communication system connecting the elevator with a point outside the hoistway. The installation and operation of this emergency communication system must comply with the ASME A17.1 code in effect when the department issued the elevator's installation permit. In addition to the appropriate ASME A17.1 code, the following department requirements apply:

- (1) The maximum height of any operable part of the communication system is 48 inches above the floor.
- (2) Raised symbols and letters must identify the communication system. These symbols and letters must be located adjacent to the communication device. The characters used must be:
 - (a) At least 5/8 inches but no more than 2 inches high;
 - (b) Raised 1/32 inch;
 - (c) Upper case;
 - (d) Sans serif or simple serif type; and
 - (e) Accompanied by Grade 2 Braille.
- (3) If the system is located in a closed compartment, opening the door to the compartment must:
 - (a) Require the use of only one hand without tight grasping, pinching, or twisting of the wrist; and
 - (b) Require a maximum force of 5 pounds.
- (4) The emergency communication system must not be based solely upon voice communication since voice-only systems are inaccessible to people with speech or hearing impairments. An indicator light must be visible when the telephone is activated. This non-verbal means must enable the message recipient to determine the elevator's location address and, when more than one elevator is installed, the elevator's number.
- (5) The emergency communication system must use a line that is capable of communicating with and signaling to a person or service that can respond appropriately to the emergency at all times.

WAC 296-96-02340 What requirements apply to the size and location of car handrails?

A handrail must be installed on all car walls not used for normal exits. The hand rails must be:

- (1) Attached to the wall at a height of between 32 and 35 inches from the floor.
- (2) Attached to the wall with a 1 1/2 inch space between the wall and the rail;
- (3) Constructed with the hand grip portion at least 1 1/4 inches but not more than 2 inches wide;
- (4) Constructed with a cross-section shape that is substantially oval or round;
- (5) Constructed with smooth surfaces and no sharp corners.

Approaching handrail ends on a blank wall in the interior corners of a car do not have to return to the wall. However, if the handrail is located on the closing door wall of a single-slide or two-speed entrance elevator and it projects an abrupt end towards people entering the car, the handrail end must return to the wall.

WAC 296-96-02350 What requirements apply to floor designations on elevator door jambs?

Floor designations must be:

- (1) Located on both sides of the doorjamb at each hoist-way entrance;
- (2) Visible from within the car and from the lobby;
- (3) Positioned on a centerline height of 60 inches above the floor;
- (4) Two inches high and raised 3/10 inch;
- (5) Placed on a contrasting color background; and
- (6) Accompanied by Grade 2 Braille. Permanently attached plates are acceptable.

WAC 296-96-02355 What are the installation and operation requirements for hall buttons?

- (1) The centerline of all hall call buttons must be 42 inches above the floor.
- (2) The "UP" direction button must be on top.
- (3) Raised or flush direction buttons, exclusive of the panel border, must be a minimum of 3/4 inch in size.
- (4) Indicator lights must be installed to show each call registered and they must extinguish when the call is answered.
- (5) When pushed, the depth of flush buttons must not exceed 3/8 inch.

WAC 296-96-02360 What are the requirements for installation and operation of hall lanterns?

- (1) A visual and audible signal must be installed at each hoistway entrance. These signals must indicate, to prospective passenger, which car is responding to the call and the direction the car is traveling.
- (2) The visual signal for each direction must be at least 2 1/2 inches in size and must be visible from the vicinity of the hall call button.
- (3) The audible signal must sound once for "up" and twice for "down".
- (4) The centerline of the lantern fixture must be located at least 6 feet above the floor.
- (5) Hall lanterns may be located either on the jamb or in the car.

WAC 296-96-02365 What is required for physically handicapped lifts?

All inclined stairway chairlifts and inclined and vertical wheelchair lifts installed only for use by individuals with disabilities and in locations other than a private residence must be equipped with a standard electric switch Chicago style lock and #2252 key.

Part C-1 Minimum Standards for Material Lifts

WAC 296-96-05010 What are the department's rules on material lifts?

- (1) These rules define a "material lift" as a fixed stationary conveyance that:
 - (a) Has a car or platform moving in guides;
 - (b) Serves two or more floors of a building or structure;
 - (c) Has a vertical rise of at least 5 feet and no more than 60 feet;
 - (d) Has a maximum speed of 50 feet per minute;
 - (e) Is not part of a conveying system but is an isolated self-contained lift;
 - (f) Travels only in an inclined or vertical direction;
 - (g) Is operated or supervised by an individual designated by the employer;
 - (h) Is installed in a commercial or industrial area not accessible to the general public; and
 - (i) May not be operated from within the car.
- (2) Material lift installation and operation must comply with chapter 296-155 WAC (Safety standards for construction work).
- (3) Material lifts must not carry people so their operation or failure will not endanger people working near them. WAC 296-96-05010 through 296-96-05290 establishes requirements for the construction, installation, and operation of material lifts. These rules allow certain conveyances designed solely to transport material and equipment to be constructed to less stringent and costly standards than ASME A17.1.

These rules do not apply to conveyances that lack a car (platform) and use rollers, belts, tracks, power conveyors, or similar carrying (loading) surfaces. (See ASME/ANSI B20.1.)

WAC 296-96-05020 What requirements apply to the construction and fire safety of hoistway enclosures? Generally, local codes and ordinances govern hoistway enclosure construction. When not in conflict with a local code requirement, the enclosure must:

- (1) Be built to a height of 7 feet above each floor, landing and adjacent stairway tread;
- (2) Extend (adjacent to the counterweights) the full height of the floor and 8 inches beyond the counterweight raceway;
- (3) Be constructed of either solid material or material with openings that will reject a 2-inch diameter ball; and
- (4) Be supported and braced so that it does not deflect more than 1 inch when subjected to a force of 100 pounds applied perpendicular at any point.

WAC 296-96-05030 What are the construction requirements for hoistway enclosure gates and doors? Enclosure gates (doors) must be constructed according to the following standards:

- (1) The gate must guard the full width of each opening on every landing.
- (2) It must be built in one of the following styles:
 - (a) Vertically sliding;
 - (b) Biparting;
 - (c) Counter-balanced;
 - (d) Horizontally swinging; or
 - (e) Horizontally sliding.
- (3) Be constructed of either solid material or material with openings that will reject a 2-inch diameter ball.

- (4) Be constructed with a distance of not more than 2 1/2 inches between a hoistway gate or hoistway door face and a landing sill edge.
- (5) Be designed and guided to withstand (without being broken, permanently deformed, or displaced from its guides or tracks) a 100 pound lateral pressure applied near its center.
- (6) Employ a combination mechanical lock and electrical contact that prevents the operation of the lift when the doors or gates are open.
- (7) Construct balanced type vertically sliding gates that extend no more than 2 inches vertically from the landing threshold and no less than 66 inches above it.

WAC 296-96-05040 What requirements apply to a hoistway that does not extend to the lowest levels of a building or structure?

If the space directly below the hoistway is accessible, the following requirements apply:

- (1) All lift counterweights must have safeties.
- (2) All cars and counterweights must have either spring or oil buffers.
- (3) Spring buffers must not fully compress when struck by a car carrying its rated load or by the counterweights when they are moving at the following speeds:
 - (a) For safeties operated by a governor, the tripping speed of the governor is the maximum striking speed.
 - (b) For safeties not operated by a governor, 125 percent of the rated speed is the maximum striking speed.
- (4) Car and counterweight-buffer supports must be able to withstand any impact upon the buffer (without permanent deformation) while occurring at the following speeds:
 - (a) For safeties operated by a governor, the tripping speed of the governor at the rated capacity is the maximum impact speed.
 - (b) For safeties not operated by a governor, 125 percent of the rated speed is the maximum impact speed.

WAC 296-96-05050 What requirements apply to lift hoist driving machines?

- (1) Lift hoist driving machines must be one of the following types:
 - (a) Winding drum.
 - (b) Traction.
 - (c) Direct plunger.
 - (d) Hydraulic.
 - (e) Roped or chained hydraulic.
 - (f) Rack and pinion.
 - (g) Roller chain drive.
 - (h) Scissors.
 - (i) Screw.
- (2) Overhead mounted driving machines must either be secured to the top of overhead beams or supported by the floor above. Hooks, cables, chains or similar devices cannot suspend driving machines.
- (3) For traction machines, the diameter of drive sheaves cannot be less than 30 times the diameter of the hoisting cables. The diameters of all other sheaves cannot be less than 21 times this diameter.

WAC 296-96-05070 What car enclosure requirements apply to lifts?

Lift cars must have their sides enclosed with solid panels or openwork that will reject a 2-inch diameter ball. On the car sides where there is no gate (door), the enclosure must extend to a height of at least 48 inches from the floor. On the car side next to the counterweight runway, the enclosure must extend vertically to the car top or underside of the car crosshead and horizontally to at least 6 inches on each side of the runway.

WAC 296-96-05080 How much running clearance is permitted between a car sill and a hoistway?

Running clearance between a car sill and a hoistway must not exceed 2 inches.

WAC 296-96-05090 What requirements apply to car and counterweight guides?

Car and counterweight guide rails must be fastened so they will not deflect more than 1/8 inch. They must also be strong enough to withstand, without deformation, the application of a car safety when the car is carrying its rated load and traveling at its rated speed.

WAC 296-96-05100 How much weight can be placed on a car frame and platform during loading and unloading?

Car frames and platforms must be designed and constructed per manufacturers' specifications to withstand the impact of the maximum weight encountered during loading and unloading.

WAC 296-96-05120 What requirements apply to car operating devices, terminal stopping devices and electrical protective devices?

If electrically operated, such devices must be enclosed. On lifts driven by winding drum machines, there must be a slack rope device employing an enclosed electric switch (manually reset type) which halts power to the drum and brake when the hoisting rope becomes slack.

WAC 296-96-05140 What requirements apply to car safeties?

Car safeties must be used on all material lifts that are suspended by wire ropes or chains. They must be able to stop and sustain a car carrying 125 percent of its rated load. On lifts driven by rack and pinion machines:

- (1) Car safeties will consist of a freely rotating safety pinion, an overspeed governor and a safety device which may be mounted on the car.
- (2) The rotating pinion driving an overspeed governor will travel on a stationary rack which is vertically mounted in the hoistway.
- (3) The governor will actuate the safety device when the downward speed of the car reaches the tripping speed and will bring the car to a gradual stop.

WAC 296-96-05150 What requirements apply to lift brakes?

On electric lifts, brakes must engage by springs and must release electronically. All brakes must have the ability to stop a car and hold it at rest while the car is carrying 125 percent of its rated load. At least one brake must be mounted on the load side of the driving machine's worm shaft. On indirectly driven lifts, brakes must engage when the driving mechanism fails.

WAC 296-96-05160 What types of ropes, chains, and rope connections must be used on a lift?

(1) The following general requirements apply:

(a) Iron (low carbon steel) or steel wire ropes with fiber cores must be used to suspend cars and counterweights.

(b) The minimum safety factor for suspension ropes must be 6 times the manufacturers rated breaking strength per rope.

(c) The car, the counterweight end of the car and the counterweight wire ropes (or the stationary hitch ends where multiple roping is used) must be fastened so that the looped ends of the turned back portion in the rope sockets are clearly visible. Fastenings must either be:

(i) Individual tapered, babbitted rope sockets; or

(ii) Other types of department approved rope fastenings.

(d) Rope sockets must develop at least 80 percent of the breaking strength of the strongest rope used in the sockets.

(e) U-bolt rope clips (clamps) cannot be used for load fastenings.

(f) A metal or plastic data tag must be securely attached to one of the wire rope fastenings each time the ropes are replaced or re-shackled. The data tag must include:

(i) The diameter of the ropes in inches; and

(ii) The manufacturer's rated breaking strength.

(iii) All replacements of wire rope or chain must be in accordance with the lift manufacturer's specifications.

(2) The following requirements apply to specific types of material lifts:

(a) Traction type lifts must use at least three hoisting ropes.

(b) Owners, operators and installers of lifts suspended by hoisting chains must comply with the chain manufacturer's specifications for maintenance, inspection, and application.

(c) Lifts using roller chain type lifting chains must use chains with a six to one safety factor based on ASME/ANSI B-29.1M minimum (not average) chain strength.

(d) Drum type lifts, must use either at least two hoisting ropes or a secondary as well as a primary load path to the hoist must be employed. Also, the cable secured to the drum must be at least one and one-half turns around the drum when the carrier is at its extreme limit of travel.

WAC 296-96-05170 What requirements apply to lift control stations?

Lift control stations must be located at each landing out of reach of the lift car. They must have controls that are permanently and clearly labeled by function. The controls must have a stop switch that will halt electrical power to the driving machine and brake. This stop switch must:

(1) Be manually operated;

(2) Have red operating handles or buttons;

(3) Be conspicuously and permanently marked "STOP"; and

(4) Clearly indicate the stop and run position.

WAC 296-96-05190 How must lift pits be constructed?

Lift pits must:

(1) Have noncombustible floors;

(2) Be designed to prevent the entry of ground water into the pit;

(3) Have floors that are substantially level;

(4) Have drains that are not directly connected to sewers;

- (5) Provide safe and convenient access to the pit;
- (6) Provide an approved ladder for pits deeper than 3 feet; and
- (7) Have non-perforated metal guards installed on the open sides of the counterweights where spring, solid or oil type buffers are attached. These guards must:
 - (a) Extend from a point not more than 12 inches above the pit floor to a point at least 7 feet but not more than 8 feet above the floor;
 - (b) Be fastened to a properly reinforced and braced metal frame which will be at least equal in strength and stiffness to No. 14 U.S. gauge sheet steel; and
 - (c) Be omitted on the pit side where compensating chains or ropes are attached to the counterweight.

WAC 296-96-05200 Which lift landings must be illuminated? All lift landings must be illuminated.

WAC 296-96-05210 What signs must be posted on landings and lifts?

Each lift must have the following two signs:

- (1) A "CAPACITY" sign permanently fastened in the lift car and on each landing. This sign must indicate the rated load of the lift in pounds and be made of metal with 2-inch high black letters on a yellow background.
- (2) A "NO RIDERS" sign conspicuously and permanently fastened on the landing side of all hoistway gates (doors) and in the enclosure of each car. This sign must be made of metal with 2-inch high black letters on a red background.

WAC 296-96-05220 What electrical wiring standards apply to lifts?

All electrical wiring, installations, and equipment in a hoistway, machine room or machinery space must conform to the National Electrical Code in effect at the time of installation or major alteration.

WAC 296-96-05230 What safety regulations apply to exposed equipment?

All exposed gears, sprockets, sheaves, drums, ropes and chains must be guarded to protect against accidental contact as required by chapter 296-24 WAC (General safety and health standards).

WAC 296-96-05240 What are the minimum maintenance requirements for lifts?

All owners, or designated owner representatives, of material lifts described in this chapter are responsible for the maintenance of their lifts and parts. Minimum maintenance requirements are:

- (1) All lifts described in this chapter and their parts must be maintained in a safe condition; and
- (2) All devices and safeguards that are required by this chapter must be maintained in good working order.

WAC 296-96-05260 When are inspections required?

Inspections are required for each lift installation, alteration or relocation and must be conducted at the completion of the job before the lift is placed into service. The inspection must include a safety test at 125 percent of rated load.

WAC 296-96-05290 Under what conditions is a five-year test administered?

A five-year test of the material lift car and counterweight safety devices must be conducted, and the test must be administered under the following conditions:

- (1) Qualified people will conduct the test. A qualified person is either the representative of a firm that manufactures, installs or services material lifts or a person approved by the department.
- (2) The car safety devices must be tested while the car is carrying a 100 percent rated load and the counterweight at no load.
- (3) A report of the test results must be submitted to the department for approval.

Part C2 - Construction, Operation, Maintenance and Inspection of Inclined Private Residence Conveyance for Transporting Person(s) for Residential Use

WAC 296-96-07010 What is the scope of these regulations?

The rules in this part are the minimum standard for all new and altered inclined private residence elevator for single family use. The purpose of this part is to provide for the safety of all persons riding in or operating an inclined private residence elevator to ensure that no person in proximity of the elevator will be endangered by its operation or failure.

WAC 296-96-07020 What is the definition for inclined private residence elevator?

"Inclined private residence elevator" means a device constructed and operated for transporting people or property from one elevation to another at an angle of inclination of seventy degrees or less from the horizontal. Essentially, it is a car or platform traveling on guides or guiding members in an inclined plane.

NOTE: For purposes of this chapter, devices installed indoors on stairways that utilize chairs to carry passengers are not considered "inclined passenger elevators."

WAC 296-96-07030 Does the department approve private residence elevator plans and specifications?

Yes. (1) Before commencing construction of any inclined private residence elevator the owner must submit complete plans and specifications to the department for approval.

(2) Plans and specifications covering the installation of an inclined private residence elevator must be endorsed by a professional engineer before the department will approve the plans.

WAC 296-96-07035 What are the minimum maintenance requirements for inclined private residence elevators?

Owners of inclined private residence elevator are responsible for the following:

- (1) Maintaining elevators and mechanical parts in a safe condition; and
- (2) Ensuring that all devices and safeguards required by these regulations are maintained in good working order.

WAC 296-96-07040 What are the clearance requirements for an incline runway?

(1) If the car sides extend less than 6 feet above the floor of the car, there must be no obstruction along the runway within 24 inches of the car sides. **EXCEPTION:** When solid guards are installed on the obstruction in both directions of travel which project at least 14 inches in line with the direction of travel, the running clearance may be reduced to 7 inches. The guard must be arched and the edges rounded to eliminate shear hazard.

(2) Guiding members and moving parts of the inclined private residence elevator must be kept free of brush and other types of material that might either impede the travel or cause deterioration of the equipment over time.

WAC 296-96-07050 What are the construction requirements for car landing enclosures and gates for inclined private residence elevators?

Any landing enclosures and gates must have:

- (1) A railing at least 42 inches high to protect all landing platforms and those areas of a building used as landing platforms; and
 - (2) A gate whose height is equal to the height of the railing to protect the passenger landing opening.
- (a) Gates may either be a horizontally sliding type or a swing type; and
 - (b) All gates must be equipped with a latch that holds the gate closed and an electrical contact to prevent movement of the car when a gate is open.

WAC 296-96-07060 What types of bumpers and buffers must be installed on inclined private residence elevators?

- (1) If spring or equivalent type buffers are not being used and rated speeds do not exceed 50 feet per minute, solid bumpers must be installed. Solid bumpers must:
 - (a) Be built of wood or other suitable resilient material;
 - (b) Have the ability to resist deterioration from weather;
 - (c) Have sufficient strength to withstand, without failure, the impact of a descending car carrying its rated load or counterweight and traveling at 115 percent of its rated speed.
- (2) Spring type buffers must be installed when speeds exceed 50 feet per minute. Spring buffers must:
 - (a) Be built with a minimum stroke of 3/4 inch and with a maximum stroke of 1 1/2 inches;
 - (b) Not fully compress when struck by a car carrying its rated load or counterweight and traveling at 115 percent of its rated speed.
- (3) Inclined private residence elevators are not required to have bumpers and buffers except when obstructions are encountered.

WAC 296-96-07070 What are the requirements for machinery beams and supports?

- (1) All machinery and sheaves must be sufficiently secured and supported to prevent any part from becoming loose or displaced. Beams directly supporting machinery must be made of steel, sound timber or reinforced concrete.
- (2) Beams and support loads must be computed as follows:
 - (a) The total load on the beams must be equal to the weight of all apparatus resting on the beams plus twice the maximum load suspended from the beams.
 - (b) The load resting on the beams must include the complete weights of the driving machine, sheaves, controller, etc.
 - (c) The load suspended from the beams must include the sum of the tensions in all ropes suspended from the beams.
- (3) The elevator driving machine or sheaves must not be fastened to the underside of the supporting beams at the top of the hoistway. EXCEPTION: Cast iron in tension must not be used for supporting members for idler and deflecting sheaves where hung beneath beams.
- (4) The factor of safety for beams and supports must be no less than:
 - (a) Five for steel; and
 - (b) Six for timber and reinforced concrete.

WAC 296-96-07080 What are the load and size requirements for car platforms?

- (1) The rated load of a platform must not exceed 700 pounds.
- (2) The inside net platform area must not exceed 12 square feet. EXCEPTION: the net platform area may be increased by no more than 3 square feet provided that shelves or benches permanently affixed to the car structure reduce the standing area to 12 square feet.

WAC 296-96-07090 What is the maximum rated speed of an incline elevator?

The maximum rated speed of an incline elevator, measured along the incline, is 75 feet per minute.

WAC 296-96-07100 What construction requirements apply to incline elevators?

- (1) Incline elevator car frames and platforms must:
 - (a) Be built of metal, a combination of metal and wood or other materials of equal strength;
 - (b) Have a safety factor of at least five; and
 - (c) Be suitably prepared and/or protected for exposure to weather.
- (2) Incline car chassis must:
 - (a) Be built of metal, except for the guiding members, and
 - (b) Have a safety factor of at least 5, based upon the car's rated load.
 - (c) Chassis guiding members must be retained and/or enclosed in guides so that the chassis cannot be derailed.
- (3) Cast iron may not be used in the construction of a car frame or chassis.
- (4) A car may have only one compartment.

WAC 296-96-07110 What construction requirements apply to car enclosures?

Car enclosures must be:

- (1) Enclosed on all sides, except at the entrance, to a height of at least 42 inches;
- (2) Enclosed with a type of material that will reject a 1 1/2 inch diameter ball;
- (3) Securely fastened to the car platform so that it cannot become loose or displaced due to ordinary service, application of the car safety, or car contact with a buffer.
- (4) Built to withstand a 75 pound pressure, horizontally applied at any point on the wall, without causing a wall deflection that reduces running clearance below 3/4 inch or above 1 inch.

WAC 296-96-07120 What construction requirements apply to car doors and gates?

- (1) All car entrances must be protected by a door or gate. The height of the door or gate must be at least 42 inches and equal to the height of the car enclosure. Doors and gates may be either of a solid design or an openwork design. If of an openwork design, the door or gate must be able to reject a 3-inch diameter ball.
- (2) Car doors or gates must be equipped with an electric contact that prevents the elevator from operating unless the door or gate is securely closed. If the gate is a swing type opening outward from the car, the electric contact must not be made until the gate is securely latched.
- (3) All car doors or gates must be manually operated.

WAC 296-96-07130 What type of glass or plastic can be used in a car enclosure?

Weather resistant plastic and tempered safety glass may be used in car enclosures.

WAC 296-96-07140 Are capacity and data plates required?

- (1) The manufacturer must install a weather resistant capacity plate. It must be securely fastened to the car in a conspicuous place and state the car's rated load in pounds using letters at least 1/4 inch high.
- (2) The manufacturer must install a metal data plate showing the car's weight, speed, suspension means data, manufacturer's name and date of installation. The data plate must be securely fastened in a conspicuous place in the machine area.

WAC 296-96-07150 What are the construction requirements for guide rails, track supports and fastenings?

- (1) Guides, guide rails, guide rail brackets, splice plates, and fastenings must be made of steel or other metals conforming to the requirements of this section.
- (2) Guides, guide rails, guide rail brackets, and their fastenings and supports must, at the point of support, deflect 1/8 inch or less while resisting horizontal forces encountered during loading. When horizontal force is measured at a mid-point between brackets, guide rails must deflect 1/4 inch or less in any direction.
- (3) The top and bottom of each guide or guide rail run must not allow a car and counterweight guiding members to travel beyond the guide rail ends.
- (4) Guides for inclined private residence elevators must have no more stresses and deflection than allowed by the manufacturer's specifications.

WAC 296-96-07160 What construction requirements apply to counterweights?

- (1) Counterweights, where used, must be in a guide or guiding members.
- (2) Counterweights must not be of sufficient weight to cause undue slackening of any car hoisting rope or chain during acceleration or retardation of the car. Counterweight weight section must be mounted in structural or formed metal frames which are designed to retain weights securely in place.

EXCEPTION: Counterweights may be constructed of a single metal plate.

WAC 296-96-07170 What are the requirements of safeties and governors?

- (1) All inclined private residence elevators must be equipped with a safety capable of stopping and sustaining a car carrying its rated load.
 - (a) Elevator safeties must be type "A" or "B" or other devices approved by the department and must be operated by a speed governor.
 - (b) Elevator safeties must operate independently of governor speed action and without delay when a hoist rope breaks.
- (2) Speed governors must operate with the safety set at a maximum speed of 140 percent of rated speed and be located where:
 - (a) If over-travel occurs, they will not be struck by the car or counterweight;
 - (b) All parts can freely and fully move; and
 - (c) They are accessible for a complete examination.
- (3) If ropes are used, they must be made of iron, steel, Monel metal or phosphor bronze and be at least 1/4 inch in diameter. Tiller rope construction must not be used.

- (4) Motor-control circuits and brake-control circuits must be opened either before the safety applies or at the time it applies.
- (5) All safeties must apply mechanically. Electrically operated safeties must not be used.
- (6) All winding drum type incline elevators that use rope suspensions must be equipped with a manually reset slack-rope device. During a car's descent, if it is obstructed and the hoisting ropes go slack, the slack-rope device must stop power to the elevator motor and brake
- (7) Cast iron must not be used to build any elevator safety part that stops and sustains the elevator.

WAC 296-96-07171 How and when are safeties and governors tested?

- (1) A safety must be tested before the inclined private residence elevator is put into service. It must be tested while the elevator is carrying its rated load.
- (2) Governors on instantaneous type safeties must be tested by hand tripping the governor while the elevator is traveling at its rated speed. Creating sufficient slack in the rope and dropping the elevator is the method of testing speed governors located on a elevator or chassis.

WAC 296-96-07180 What are the construction requirements for driving machines and sheaves?

- (1) Winding drums, traction sheaves, overhead sheaves and deflecting sheaves must:
 - (a) Be made of cast iron or steel;
 - (b) Have diameters at least 30 times the diameter of the wire hoisting ropes; and
 - (c) Have machined rope grooves. EXCEPTION: (1) If 8 x 19 steel ropes are used, drum and sheave diameters may be reduced to 21 times the diameter of the hoisting rope.
- (2) Existing incline lifts suspended by cables are not required to have machine grooves, except for the first row of cables wrapped on the drum.
- (3) The factor of safety, based on the static load (the rated load plus the weight of the car, ropes, counterweights, etc.) to be used in the design of driving machines and sheaves, must be at least:
 - (a) Eight for driving machines and sheaves built of wrought iron and steel; or
 - (b) Ten for driving machines built of cast iron, cast steel or other materials.
- (4) Set screw type fastenings must not be substituted for keys or pins if connections are subject to torque or tension.
- (5) Gears:
 - (a) When connecting drums or sheaves to the main driving gear, friction gears, clutch mechanisms or couplings must not be used.
 - (b) Worm gears having cast iron teeth must not be used.
- (6) Brakes:
 - (a) Electric brakes must be of the friction type set by springs and must release electrically.
 - (b) All brakes must be able to stop and hold a elevator carrying 125 percent of its rated load.
 - (c) At least one brake must be mounted on the load side of the driving machine's worm shaft. On indirectly driven elevators, brakes must engage when the driving machine fails.
 - (d) If a single ground or short-circuit, a counter-voltage or a motor field discharge occurs and the operating device is set in the stop position, the brake magnet must set the brake.
- (7) Driving machines:

- (a) A driving machine may be mounted on a elevator chassis or in a remote location. However, if mounted in a remote location, all sheaves and sprockets must be guarded and positioned so the hoisting ropes and chains remain properly aligned while the elevator is in use.
- (b) Screw type machines must not be used.
- (c) Hydraulic driving machines must conform to ASME A17.1.
- (d) Roped-hydraulic machines may be used.

WAC 296-96-07190 What construction requirements apply to terminal stopping switches?

A hoistway must be equipped with normal upper and lower terminal stopping switches that are activated by a elevator chassis. These switches must stop the elevator at the normal top and bottom terminals of travel.

- (1) A hoistway must be equipped with final terminal stopping switches that are activated by a elevator chassis. These switches must stop the elevator from traveling beyond the normal terminals and prevent it from moving in both directions.
- (2) Winding drum machines may use a slack cable switch instead of a bottom final terminal switch.
- (3) Normal and final terminal stopping switches must not control the same switches on the controller unless at least two separate and independent switches are used. At least two of these separate switches must be closed in order to complete the motor and brake circuits for each direction of travel.

WAC 296-96-07200 What are the requirements for operation of an inclined private residence elevator?

- (1) An inclined private residence elevator must be operated by constant pressure or momentary pressure key switches located at each operating station and on the elevator:
 - (a) The key or code must be entered each time to move the elevator.
 - (b) Key-operated switches must be of the spring return type and must be operated by a weatherproof cylinder type lock having not less than five pin or five disc combination with the key removable only when the switch is in the off position.
 - (c) On existing installations with key/button operations, the key must be activated each time to energize the operation.
- (2) Emergency stop switches must be provided on or adjacent to the operating station. Stop switches must:
 - (a) Be of a manually opened and manually closed type;
 - (b) Have red handles or buttons and be conspicuously marked "STOP;"
 - (c) Open even if springs fail when springs are used.
- (3) Design and installation of control and operating circuits must meet the following:
 - (a) Control systems based upon the completion or maintenance of an electric circuit must not be used for interrupting power and applying machine brakes at terminals; stopping elevators when an emergency stop switch is open or when any electrical protective device operates; stopping a machine when the safety applies.
 - (b) If springs are used to activate switches, contact, or circuit breaking relays to stop the elevator at a terminal, the springs must be a restrained compression type.
- (4) Hand rope operation must not be used.

WAC 296-96-07210 What are the construction requirements for suspension methods?

(1) When a chassis is suspended from a driving machine by a wire rope, a single method of suspension may be used. The suspension means may be any one of the following:

- (a) Steel elevator wire rope;
- (b) Steel aircraft cable; or
- (c) Roller chain conforming to ANSI transmission roller chains and sprocket teeth.

(2) Steel tapes must not be used as a suspension method.

(3) The minimum diameter of hoist ropes or cables must be 1/4 inch for elevator wire rope and 3/16 inch for galvanized aircraft cable.

(4) Factor of safety:

(a) The minimum factor of safety for a suspension method is 8 based upon the rope tension while elevating a car carrying its rated load.

(b) In no case, must the rated breaking strength of the rope be less than 4,000 pounds.

(5) The contact arc of a wire rope on a traction sheave must be sufficient to produce adequate traction under all load conditions.

(6) All wire ropes anchored to a winding drum must have at least one full turn of rope on the drum when the car or counterweight reaches its over-travel limit.

(7) The winding-drum ends of car and counterweight wire ropes must be secured by:

- (a) Clamps on the inside of the drum; or
- (b) Return loop; or
- (c) Properly made individual tapered babbitted sockets; or
- (d) Properly attached fittings recommended by wire rope manufacturers.
- (e) U-bolt type clamps must not be used.

(8) The ends of wire ropes must be fastened to cars or counterweights by:

- (a) Return loop; or
- (b) Properly made individual tapered babbitted sockets that conform to ASME A17.1 requirements. (The diameter of the hole in the small end of the socket must not exceed the nominal diameter of the rope by more than 3/32 inch.); or properly attached fittings recommended by wire rope manufacturers.
- (c) U-bolt type clamps must not be used.

(9) Rope repair:

(a) Car and counterweight wire ropes cannot be lengthened or repaired by splicing.

(b) If a single wire rope in a set is worn or damaged and needs to be replaced, the entire set must be replaced.

WAC 296-96-07220 What are the requirements for traveling cables?

(1) All traveling cables must conform to the National Electrical Code (NEC) in effect at the time of installation or major alteration.

(2) Where circuits through the traveling cable(s) exceed 30 volts, a means must be provided to stop the power automatically if the traveling cables part.

WAC 296-96-07230 What requirements apply to electrical wiring?

- (1) All wiring must conform to the National Electrical Code (NEC) in effect at the time of installation or major alteration.
- (2) If a driving machine is mounted on the elevator chassis, the electrical connections between the elevator and the power source must be able to stop power if a traveling cable parts.
- (3) All electrical connections between the elevator and the stationary connections must be insulated flexible conductors conforming to NEC Article 620, Elevators, Dumbwaiters, Escalators, Moving Walks, Wheelchair Lifts, and Stairway Chair Lifts.

WAC 296-96-07240 What are the requirements for track supporting structures? All supporting structures must meet the local building codes.

WAC 296-96-07250 What additional requirements apply to inclined private residence elevators?

- (1) All inclined private residence elevators must be equipped with:
 - (a) A hand crank capable of moving the elevator in accordance with ASME A17.1; and
 - (b) A machine brake with a lever to release the brake allowing use of the hand crank.
- (2) Machinery spaces must be protected from weather and accidental contact.
- (3) Guiding members and moving parts of the inclined private residence elevator must be free of brush and other types of material that might either impede the travel or cause deterioration of the equipment over time.

Part C3 - Construction, Operation, Maintenance and Inspection of Private Residence Conveyances for Transporting Property for Residential Use

WAC 296-96-08010 What is the scope of these regulations?

The rules in this section are the minimum standard for all new, altered, and existing inclined private residence elevators for transporting property for single family use in a private residence. The purpose of this section is to ensure that inclined private residence elevators will be used only for transporting materials and goods, not people, and that no person in proximity of the elevator will be endangered by its operation or failure.

WAC 296-96-08020 What is the definition for inclined private residence elevator for transporting property?

"Inclined private residence elevator for transporting property" means a device constructed and operated for transporting property from one elevation to another at an angle of inclination of 70 degrees or less from the horizontal. Essentially, it is a car or platform traveling on guides or guiding members in an inclined plane.

WAC 296-96-08030 Does the department approve elevators plans and specifications? Yes.

- (1) Before commencing construction of any inclined private residence elevator for transporting property the owner must submit complete plans and specifications to the department for approval.
- (2) Plans and specifications covering the installation of an inclined private residence elevator for transporting property must be endorsed by a professional engineer before the department will approve the plans.

WAC 296-96-08035 What are the minimum maintenance requirements for inclined private residence elevators for transporting property?

Owners of inclined private residence elevators for transporting property are responsible for ensuring that:

- (1) Elevators and their parts are maintained in a safe condition; and
- (2) All devices and safeguards required by these regulations are maintained in good working order.

WAC 296-96-08050 What are the construction requirements for inclined private residence elevator for transporting property for cars, landing gates, and enclosures?

- (1) Any landing enclosure must have a railing at least 42 inches high to protect all landing platforms and those areas of a building used as landing platforms.
- (2) Where gates are not provided at the entrance to the platform, a chain with a sign must be provided to block the landing entrance. The sign must state "Keep off landing until elevator has stopped at platform."
- (3) If gates are provided, they must be:
 - (a) Either be a horizontally sliding type or a swing type; and
 - (b) Equipped with a latch that holds the gate closed and an electrical contact to prevent movement of the elevator when a gate is open.

WAC 296-96-08060 What types of bumpers and buffers must be installed on inclined private residence elevators for transporting property?

Solid bumpers or spring type buffers may be used. (1) Solid bumpers must:

- (a) Be built of wood or other suitable resilient material;
 - (b) Have the ability to resist deterioration from weather; and
 - (c) Have sufficient strength to withstand, without failure, the impact of a descending elevator carrying its rated load or counterweight and traveling at 115 percent of its rated speed.
- (2) Spring type buffers, if used, must:
- (a) Be built with a minimum stroke of 3/4 inch and with a maximum stroke of 1 1/2 inches; and
 - (b) Not fully compress when struck by the elevator carrying its rated load or counterweight and traveling at 115 percent of its rated speed.
- (3) Inclined private residence elevators are not required to have bumpers and buffers except when obstructions are encountered.

WAC 296-96-08070 What are the requirements for machinery beams and supports?

- (1) All machinery and sheaves must be sufficiently secured and supported to prevent any part from becoming loose or displaced. Beams directly supporting machinery must be made of steel, sound timber or reinforced concrete.
- (2) Beams and support loads must be computed as follows:
- (a) The total load on the beams must be equal to the weight of all apparatus resting on the beams plus twice the maximum load suspended from the beams.
 - (b) The load resting on the beams must include the complete weights of the driving machine, sheaves, controller, etc.
 - (c) The load suspended from the beams must include the sum of the tensions in all ropes suspended from the beams.
- (3) The elevator driving machine or sheaves shall not be fastened to the underside of the supporting beams at the top of the hoistway. EXCEPTION: Cast iron in tension must not be used for supporting members for idler and deflecting sheaves where they are hung beneath beams.
- (4) The factor of safety for beams and supports must be no less than:
- (a) Five for steel; or
 - (b) Six for timber and reinforced concrete.

WAC 296-96-08080 What are the load and size requirements for car platforms?

- (1) The rated load of a platform must not exceed 5,000 pounds.
- (2) The rated load of the platform must be no less than the load to be carried and must not exceed 50 pounds per square foot of inside net platform area.

WAC 296-96-08090 What is the maximum rated speed of an incline elevator?

The maximum rated speed of an incline elevator, measured along the incline, is 75 feet per minute.

WAC 296-96-08100 What requirements apply to incline elevators?

- (1) Incline elevator frames and platforms must:
- (a) Be built of metal, a combination of metal and wood or other materials of equal strength;
 - (b) Have a safety factor of at least 5; and
 - (c) Be suitably prepared and/or protected for exposure to weather.

(2) Incline elevator chassis must:

- (a) Be built of metal, except for the guiding members;
 - (b) Have a safety factor of at least 5, based upon the elevator's rated load; and
 - (c) Have the chassis guiding members retained and/or enclosed in guides so that the chassis cannot be derailed.
- (3) Cast iron may not be used in the construction of the elevator frame or chassis.
- (4) A car may have only one compartment.

WAC 296-96-08110 What requirements apply to car enclosures?

- (1) Car enclosures are not required; however, if provided, the car enclosure must be:
- (a) Securely fastened to the car platform so that it cannot become loose or displaced due to ordinary service, application of the elevator safety, or from the elevator coming into contact with the buffer.
 - (b) Built to withstand a 75 pound pressure, horizontally applied at any point on the wall, without causing a wall deflection that reduces running clearance below 3/4 inch or above 1 inch.
- (2) If glass or plastic is used in the car enclosure, it must be weather resistant plastic or tempered safety glass.
- (3) Where there is no car enclosure, a means must be provided to secure all materials to the platform.

WAC 296-96-08140 Are capacity and data plates required on inclined private residence elevator for transporting property?

- (1) The manufacturer must install a weather resistant capacity plate. It must be securely fastened to the elevator in a conspicuous place and state the elevator's rated load in pounds using letters at least 1/4 inch high.
- (2) The manufacturer must install a metal data plate showing the elevator's weight, speed, suspension means data, manufacturer's name and date of installation. The data plate must be securely fastened in a conspicuous place in the machine area.

WAC 296-96-08150 What are the requirements for guide rails, track supports and fastenings?

- (1) Guides, guide rails, guide rail brackets, splice plates, and fastenings must be made of steel or other metals conforming to the requirements of this section.
- (2) Guides, guide rails, guide rail brackets, and their fastenings and supports must, at the point of support, deflect 1/8 inch or less while resisting horizontal forces encountered during loading. When horizontal force is measured at a mid-point between brackets, guide rails must deflect 1/4 inch or less in any direction.
- (3) The top and bottom of each guide or guide rail run must not allow the elevator and counterweight guiding members to travel beyond the guide rail ends.
- (4) Guides for inclined private residence elevators must have no more stresses and deflection than allowed by the manufacturer's specifications.

WAC 296-96-08160 What requirements apply to counterweights?

- (1) Counterweights, where used, must be in a guide or track.
- (2) Counterweights must not be of sufficient weight to cause undue slackening of any elevator hoisting rope or chain during acceleration or retardation of the elevator. Counterweight weight section must be mounted in structural or formed metal frames which are designed to retain weights securely in place.

EXCEPTION: Counterweights may be constructed of a single metal plate.

WAC 296-96-08170 What are the requirements of safeties and governors?

- (1) All inclined private residence elevators for transporting property must have a slack cable safety device capable of stopping and sustaining a car carrying its rated load.
- (2) Other types of approved safety devices may be used. If so, such devices must meet the requirements of WAC 296-96-07170.

WAC 296-96-08175 How and when are elevator safeties tested? The elevator safety must be tested before the inclined private residence elevators for transporting property is put into service. It must be tested while the elevator is carrying its rated load.

WAC 296-96-08180 What are the requirements for driving machines and sheaves?

- (1) All new winding drums, traction sheaves, overhead sheaves and deflecting sheaves must:
 - (a) Be made of cast iron or steel;
 - (b) Have diameters at least 30 times the diameter of the wire hoisting ropes. EXCEPTION: If 8 x 19 steel ropes are used, drum and sheave diameters may be reduced to 21 times the diameter of the hoisting rope; and
 - (c) Have machined rope grooves.
- (2) The factor of safety, based on the static load (the rated load plus the weight of the car, ropes, counterweights, etc.) to be used in the design of driving machines and sheaves, must be at least 5.
- (3) Set screw type fastenings must not be substituted for keys or pins if connections are subject to torque or tension.
- (4) Gears:
 - (a) When connecting drums or sheaves to the main driving gear, friction gears, clutch mechanisms or couplings must not be used.
 - (b) Worm gears having cast iron teeth must not be used.
- (5) Brakes:
 - (a) Electric brakes must be of the friction type set by springs and must release electrically.
 - (b) All brakes must be able to stop and hold a car carrying 125 percent of its rated load.
 - (c) At least one brake must be mounted on the load side of the driving machine's worm shaft. On indirectly driven lifts, brakes must engage when the driving machine fails.
 - (d) If a single ground or short-circuit, a counter-voltage or a motor field discharge occurs and the operating device is set in the stop position, the brake magnet must set the brake.
- (6) Driving machines:
 - (a) A driving machine may be mounted on a elevator chassis or in a remote location. However, if mounted in a remote location, all sheaves and sprockets must be guarded and positioned so the hoisting ropes and chains remain properly aligned while the elevator is in use.

- (b) Screw type machines must not be used.
- (c) Hydraulic driving machines must conform to ASME A17.1.
- (d) Roped-hydraulic machines may be used.
- (e) Rack and pinion drive may be used.

EXCEPTION: Existing inclined private residence elevators for transporting property may use wrapped cable drums as long as they do not show signs of excessive wear.

WAC 296-96-08190 What requirements apply to terminal stopping switches?

A hoistway must be equipped with normal upper and lower terminal stopping switches that are activated by the elevator chassis. These switches must stop the elevator at the normal top and bottom terminals of travel.

- (1) Winding drum machines may use a slack cable switch as a bottom final terminal switch.
- (2) Normal and final terminal stopping switches must not control the same switches on the controller unless at least two separate and independent switches are used. At least two of these separate switches must be closed in order to complete the motor and brake circuits for each direction of travel.

WAC 296-96-08200 What are the requirements for operation of an inclined private residence elevators for transporting property?

- (1) An inclined private residence elevator for transporting property must be operated by constant pressure or momentary pressure key switches located at each operating station/landing:
 - (a) The key or code must be entered each time to move the elevator.
 - (b) Key-operated switches must be of the spring return type and must be operated by a weatherproof cylinder type lock having not less than five pin or five disc combination with the key removable only when the switch is in the off position.
 - (c) On existing installations with key/button operations, the key must be activated each time to energize the operation.
- (2) Emergency stop switches must be provided on or adjacent to the operating station. Stop switches must:
 - (a) Be of a manually opened and manually closed type;
 - (b) Have red handles or buttons and be conspicuously marked "STOP;"
 - (c) Open even if springs fail when springs are used.
- (3) Design and installation of control and operating circuits must meet the following:
 - (a) Control systems based upon the completion or maintenance of an electric circuit must not be used for interrupting power and applying machine brakes at terminals, stopping elevators when an emergency stop switch is open or when any electrical protective device operates, or for stopping a machine when the safety applies.
 - (b) If springs are used to activate switches, contact, or circuit breaking relays to stop the elevator at a terminal, the springs must be a restrained compression type.
- (4) Hand rope operation must not be used.

WAC 296-96-08210 What are the requirements for suspension methods? (1) When a chassis is suspended from a driving machine by a wire rope, a single method of suspension may be used. The suspension means may be any one of the following:

- (a) Steel elevator wire rope;

- (b) Steel aircraft cable; or
- (c) Roller chain conforming to ANSI transmission roller chains and sprocket teeth.
- (2) Steel tapes must not be used as a suspension method.
- (3) The minimum diameter of hoist ropes or cables must be 3/8 inch for elevator wire rope and 3/16 inch for galvanized aircraft cable.
- (4) Factor of safety:
 - (a) The minimum factor of safety for a suspension method is 5 based upon the rope tension while elevating the elevator carrying its rated load.
 - (b) In no case, must the rated breaking strength of the rope be less than 4,000 pounds.
- (5) The contact arc of a wire rope on a traction sheave must be sufficient to produce adequate traction under all load conditions.
- (6) All wire ropes anchored to a winding drum must have at least one full turn of rope on the drum when the car or counterweight reaches its over-travel limit.
- (7) The winding-drum ends of car and counterweight wire ropes must be secured by:
 - (a) Clamps on the inside of the drum;
 - (b) Return loop;
 - (c) Properly made individual tapered babbitted sockets; or
 - (d) Properly attached fittings recommended by wire rope manufacturers. U-bolt type clamps must not be used.
- (8) The ends of wire ropes must be fastened to cars or counterweights by:
 - (a) Return loop;
 - (b) Properly made individual tapered babbitted sockets that conform to ASME A17.1 requirements (The diameter of the hole in the small end of the socket must not exceed the nominal diameter of the rope by more than 3/32 inch.); or
 - (c) Properly attached fittings recommended by wire rope manufacturers. U-bolt type clamps must not be used.
- (9) Rope repair:
 - (a) Car and counterweight wire ropes cannot be lengthened or repaired by splicing.
 - (b) If a single wire rope in a set is worn or damaged and needs to be replaced, the entire set must be replaced.
- (10) A metal or plastic data tag must be securely attached to one of the wire rope fastenings each time the ropes are replaced or reshackled. The data tag must include:
 - (a) The diameter of the ropes in inches; and
 - (b) The manufacturer's rated breaking strength.

WAC 296-96-08220 What are the requirements for traveling cables?

- (1) All traveling cables must conform to the National Electrical Code (NEC) in effect at the time of installation or major alteration.
- (2) Where circuits through the traveling cable(s) exceed 30 volts, a means must be provided to stop the power automatically if the traveling cables part.

WAC 296-96-08230 What requirements apply to electrical wiring?

- (1) All wiring must conform to the National Electrical Code (NEC) in effect at the time of installation or major alteration.
- (2) If a driving machine is mounted on the elevator chassis, the electrical connections between the elevator and the power source must be able to stop power if a traveling cable parts.

(3) All electrical connections between the elevator chassis and the stationary connections must be insulated flexible conductors conforming to NEC Article 620, Elevators, Dumbwaiters, Escalators, Moving Walks, Wheelchair Lifts, and Stairway Chair Lifts.

WAC 296-96-08240 What are the requirements for track supporting structures?

All supporting structures must meet the local building codes.

WAC 296-96-08250 What additional requirements apply to inclined private residence elevators for transporting property?

(1) All inclined private residence elevators for transporting property must be equipped with:

(a) A hand crank capable of moving the elevator in accordance with ASME A17.1; and

(b) A machine brake with a lever to release the brake allowing use of the hand crank.

(2) Machinery spaces must be protected from weather and accidental contact.

(3) Metal signs stating "NO RIDERS" in two-inch letters must be conspicuously posted and permanently attached to the elevator and at each landing.

Part C4 - Temporary Hoists

Personnel Hoists

WAC 296-96-09001 What regulations apply to personnel hoists?

All personnel hoists installed must comply with the American National Standard Institute ANSI A10.4-1990 edition or the latest published edition adopted by ANSI, Safety Requirements for Personnel Hoists and Employee Elevators for Construction and Demolition Operations.

WAC 296-96-09002 Can a drop plate be used for temporary hoists?

Drop plates for temporary hoists may be allowed provided that they are permanently attached to the elevator.

Material Hoists

WAC 296-96-10001 What regulations apply to material hoists?

All material hoists must comply with the American National Standard Institute ANSI A10.5-1992 edition or the latest published edition adopted by ANSI, Safety Requirements for Material Hoists.

Part C5 - Additional Types of Conveyances

Belt Manlifts

WAC 296-96-11000 What regulations apply to belt manlifts after 1974?

All belt manlifts must comply with the USAS A90-1969.

WAC 296-96-11001 What regulations apply to belt manlifts prior to 1974?

BELT MANLIFT CODE			
TITLE	DATE INSTALLED		COMMENTS
	FROM	TO	
Existing Belt Manlifts	1962	1974	Used as existing standard for belt manlifts installed in years effective.

WAC 296-96-11010 What are the definitions for belt manlifts?

"Closed type handhold" a cup-shaped handhold with the handgrip surface uncovered in the direction of travel and covered on the opposite run.

"Factor of safety" is the ratio of the ultimate strength of the material used to manufacture a part to the allowable stress on that part when it is subjected to full load operating conditions.

"Handhold" or **"Handgrip"** is the device attached to the manlift belt to assist a passenger in maintaining balance when using the manlift. For the purposes of this chapter, the word "handhold" is used for both "handhold" and "handgrip."

"Limit switch" is a safety device that stops power to the manlift motor and applies the brakes if a loaded step passes the top terminal landing.

"Manlift" is a device using a power-driven, endless belt with attached handholds and steps or platforms to transport people from floor to floor.

"Open type handhold" is a handhold with a fully uncovered handgrip surface.

"Rated speed" is the operating speed for which a manlift is designed and installed.

"Step" or **"Platform"** is the passenger carrying part of a manlift. For the purposes of this chapter, the word "step" is used for both "step" and "platform".

WAC 296-96-11016 What structural requirements apply to belt manlift landings?

(1) Vertical clearance between the floor or mounting platform and the lower edge of the conical guard above it must be at least 7 feet, 6 inches. When this clearance is not possible, access to the manlift must be prohibited and the space where the runway passes through the platform floor must be enclosed.

(2) Floor space adjacent to floor openings must be kept clear and free of obstructions at all times.

(3) Adequate lighting (not less than 3 foot-candle power) must be provided at each floor landing whenever the lift is in use.

(4) The landing surfaces at all entrances and exits must provide safe footing and must have a coefficient of friction of at least 0.5 to help insure safe footing.

(5) Emergency landings must be provided so that the maximum distance a person must travel on the emergency ladder between an emergency landing and a floor landing is 25 feet. Emergency landings must:

- (a) Be accessible from both runs of the lift;
- (b) Give access to the emergency ladder; and
- (c) Be completely enclosed with a standard railing and toeboard.

WAC 296-96-11019 What structural requirements apply to belt manlift landings?

- (1) On the ascending side of the lift, all landings must have a beveled guard or cone that meets the following requirements:
 - (a) Where possible, a cone must make an angle with the horizontal of at least 45 degrees. A cone angle of 60 degrees or more must be used where ceiling heights permit.
 - (b) Where possible, a guard must extend at least 42 inches outward from any belt handhold. A guard must not extend beyond the upper surface of the floor above.
 - (c) A cone must be built of sheet steel (at least No. 18 U.S. gauge) or any material of equivalent strength or stiffness. The lower edge of a cone must be rolled to a minimum diameter of 1/2 inch. The interior of a cone must be smooth with no protruding rivets, bolts or screws.
- (2) All obstructions must be guarded just like floor openings with the same minimum distances observed.

WAC 296-96-11022 What requirements apply to guarding lift entrances and exits?

- (1) All manlift floor or landing entrances and exits must be guarded by either a maze (staggered railing) or a handrail equipped with self-closing gates.
- (2) When a maze is used:
 - (a) Maze or staggered openings must not allow direct passage between a platform enclosure and the outer floor space;
 - (b) Rails must be located between 2 and 4 feet from the edge of the opening as measured at right angles to the face of the belt; and
 - (c) At openings, the intersection of the top rail and the end post must form a bend or standard long sweep "ell."
- (3) When a handrail is used:
 - (a) Rails must be standard guardrails with toeboards and meet the guard rail requirements located in chapter 296-24 WAC, General safety and health standards; and
 - (b) Gates must have rounded corners, open outward, and be self-closing.
- (4) Unless prevented by building design, all entrances and exits at all landings must be in the same relative location.

WAC 296-96-11025 What structural requirements apply to floor opening guards? Except on the entrance or exit side, floor openings at each landing must be guarded.

- (1) The guards must be constructed by one of the following methods:
 - (a) A standard railing and toeboard;
 - (b) Panels of wire mesh (not less than No. 10 U.S. gauge);
 - (c) Panels of expanded metal (not less than No. 13 U.S. gauge);
 - (d) Panels of sheet metal (not less than No. 13 U.S. gauge); or
 - (e) Metal on a frame of either angle iron (at least 1 1/4 by 1 1/8 inch) or 1 1/4 inch iron pipe.
- (2) When a belt manlift is installed in a stairwell, a standard guardrail must be placed between the floor openings and the stairway.

(3) Rails or guards must be:

(a) At least 42 inches high on the up-running side and 66 inches high on the down-running side; and

(b) Be located not more than one foot from the edge of the floor opening.

(4) If a guardrail is used, the section of the guard above the rail may be constructed:

(a) According to WAC 296-96-10025(1); or

(b) Using either vertical or horizontal bars capable of rejecting a 6-inch diameter ball.

WAC 296-96-11028 What structural requirements apply to floor landing guards?

Expanded metal, sheet metal or wooden guards must be installed on each floor landing to prevent people from placing their hands in areas where step-rollers operate. These guards must be installed on each exposed side of the lift and extend from the floor to a height of 7 feet.

WAC 296-96-11031 What requirements apply to bottom landings?

(1) Bottom landing clear areas:

(a) Where possible, the clear area of a bottom landing must be at least the size of the area enclosed by guardrails on the floors above;

(b) A clear area must be free of stairs and ladders; and

(c) If a wall on the bottom landing is located in front of the down-running side of the belt, it must be installed at least 48 inches away from the belt face.

(2) The lowest landing served by the lift must support the lower (boot) pulley installation.

(3) A mounting platform must be installed on the lowest landing unless the landing floor is at or above the point at which the upper surface of the belt steps assume or leave a horizontal position.

(4) If a mounting platform is installed, it must be located in front of or to one side of the up/down run.

WAC 296-96-11034 What requirements apply to top clearance?

(1) When the center of the head pulley is more than 6 feet above the top landing, an emergency landing and ladder must be installed.

(2) The location of the emergency landing must be 24 inches below the center of the head pulley.

WAC 296-96-11037 What requirements apply to emergency exit ladders?

Emergency exit ladders must be:

(1) A fixed metal type;

(2) Accessible from either the "up" or "down" path of the lift;

(3) Installed when the vertical distance between landings exceeds 20 feet; and

(4) Constructed to comply with current general safety standards except enclosed cages need not be built.

WAC 296-96-11040 What lighting requirements apply to belt manlifts?

(1) When a lift is in operation, both runs must be illuminated at all points with an intensity of at least one foot-candle.

(2) Lighting control in runways must be:

(a) Circuits tied permanently into the building circuits (no switches);

(b) Near the starting switch that controls the lift motor; or

(c) Separate switches located on every landing and with each switch having the capability of turning on all lights throughout the entire runway.

WAC 296-96-11045 What drive machine requirements apply to belt manlifts?

- (1) Belt manlifts must be driven either by directly connected machines or by multiple "V" belts.
- (2) Cast iron gears must not be used.
- (3) Brakes:
 - (a) On direct connected machines, the brake must be mechanically applied to the motor shaft and released electronically.
 - (b) On "V" belt driven machines, the brake must be mechanically applied to the input shaft and released electronically.
 - (c) All brakes must be capable of stopping and holding the lift while carrying its rated capacity.
- (4) Belts fastening:
 - (a) Belts must be fastened either by a lapped splice or a butt splice with a strap on the belt side opposite the pulley.
 - (b) For lapped splices on manlifts with travel distances not exceeding 100 feet, the overlap of the belt at the splice must be at least 3 feet; or
 - (c) For lapped splices exceeding 100 feet, the overlap at the splice must be at least 4 feet.
 - (d) For butt splices on manlifts with travel distances not exceeding 100 feet, the strap must extend at least 3 feet on one side of the butt; or
 - (e) For butt splices not exceeding 100 feet, the strap must extend at least 4 feet on one side of the butt.
 - (f) For 12-inch belts, the joint must be fastened with a minimum of 20 special elevator bolts with minimum diameters of 1/4 inch. To effectively cover the belt joint area, these bolts must be arranged symmetrically in 5 rows.
 - (g) For a 14-inch belt, the minimum number of bolts is 23.
 - (h) For a 16-inch belt, the minimum number of bolts is 27.
- (5) All installations must use machines designed and constructed to hold the driving pulley when there is shaft failure or overspeed.

WAC 296-96-11048 What is an acceptable operating speed for a belt manlift?

The maximum belt speed of a belt manlift is 80 feet per minute. No belt manlift may be installed that exceeds this maximum speed limit, and all belt manlifts in a given location should run at approximately the same speed.

WAC 296-96-11051 What are the construction requirements for steps?

- (1) Measured from the belt to the edge of the step, the minimum depth of a step is 12 inches and the maximum depth is 14 inches.
- (2) Step width cannot be less than the width of the belt to which it is attached.
- (3) Measured from the upper surface of one step to the upper surface of the next step above, the distance between steps must be at least 16 feet and the steps must be equally spaced along the belt.
- (4) A step must be attached to the belt so its surface approximates a right angle with the face of the belt enabling the step to travel in basically a horizontal position with the "up" and "down" path of the belt.
- (5) The working (upper) surface of a step must be made of either a material having non-slip

characteristics (possessing a coefficient of friction of not less than 0.5) or be completely covered with a securely attached non-slip tread.

(6) Step supports (frames) and guides must be sufficiently strong to prevent:

- (a) The disengagement of any step roller;
- (b) Any appreciable misalignment; or
- (c) Any visible deformation of the step or its support.

(7) Steps must have corresponding handholds.

(8) If a step is removed for any reason, the handholds immediately above and below it must be removed before the lift resumes operation.

WAC 296-96-11054 What requirements apply to the location and construction of handholds?

(1) Handholds attached to the belt must be provided and installed so that they are not less than 4 feet nor more than 4 feet 8 inches above the step tread. These handholds must be available on both the "up" and "down" run of the belt.

(2) All handhold grab surfaces must be at least 4 1/2 inches in width. Fastenings must not come within one inch of the belt edge.

(3) All handholds must be capable of withstanding, without damage, a 300 pound load applied parallel to the belt run.

(4) All handholds must have corresponding steps. When a handhold is removed for any reason, the corresponding step and handhold for the opposite direction of travel must also be removed before the lift resumes operation.

WAC 296-96-11057 What requirements apply to "up-limit stops"?

(1) Two separate automatic stop devices must be provided to cut off the power and apply the brake when a loaded step passes the upper terminal landing. One of these devices must consist of a switch mechanically operated by the belt or stop roller. The second consist of any of the following:

- (a) A roller switch located above but not in line with the first switch;
- (b) A photocell and light source (an "electric eye"); or
- (c) A switch activated by a lever, rod or plate. (If a plate is used, it should be positioned above the head pulley so it barely clears a passing step.)

(2) The stop device must stop the lift before a loaded step reaches a point 24 inches above the top terminal landing.

(3) Once the lift has stopped, the automatic stop device must be manually reset. Therefore, this device must be located on the top landing where the reset person has a clear view of both the "up" and "down" runs of the lift; and it must be impossible to reset from a step.

(4) Electric stop devices must meet the following requirements:

- (a) All electric switches that directly open the main motor circuit must be multiple type switches;
- (b) Photoelectric devices must be designed and installed so that failure of the light source, the light sensitive element or any vacuum tube used in the circuit will result in shutting off power to the driving motor;

(c) In areas where flammable vapors or dust may be present, all electrical installations must be in accordance with the NEC requirements for those installations; and

(d) All controller contacts carrying main motor current must be copper to carbon types unless the circuit is simultaneously broken at two or more points or the contacts are immersed in oil.

WAC 296-96-11060 What requirements apply to emergency stops?

All belt manlifts must have emergency stop devices that:

- (1) Are located within easy reach of the "up" and "down" run of the belt;
- (2) Stop power to the lift and apply the lift brake when pulled in the direction of travel;
- (3) Have a treadle switch (manual re-set type) that is located below the lowest landing on the belt's "down" side and, if a person fails to get off at the lowest landing, stops the lift and ejects the person from the step as it approaches the boot pulley;
- (4) Are made of cotton rope with a wire center, manila or sisal rope, or metal pipe or tubing. Wire rope cannot be used, unless covered with marlin. Rope stops must be at least 3/8 inch in diameter; and
- (5) An emergency stop may be used for normal stopping and starting if the lift does not run continuously.

WAC 296-96-11066 What are the warning sign requirements? (1) Instructional signs explaining how to use the belt lift must be:

- (a) Conspicuously posted on each landing or stenciled on the belt;
- (b) Printed in an easily read style with letters at least one inch in height;
- (c) Printed in a color that clearly contrasts with the background surface (for example, white or yellow on black or black on white or gray); and
- (d) Examples of instructional signs are:

"Face the belt"

"Use the handhold"

"To stop - pull rope"

- (2) Warning signs and/or lights must include an illuminated sign or red warning light announcing the top floor and must be within easy view of an ascending passenger.

- (a) If a sign, it must be located no more than 2 feet above the top terminal landing and printed in block letters (at least 2-inches in height) displaying the words, "Top floor - get off."

- (b) If a red light, it must have at least a 40-watt rating and be located immediately below the upper terminal landing where it will shine in the belt passenger's face.

- (3) There must be conspicuous signs on each landing that read, "Employees only - Visitors keep off," printed in block letters (at least 2-inches in height) in a color that sharply contrasts with the background.

- (4) A sign or red light must be conspicuously posted above the bottom landing announcing its approach. These must be:

- (a) If a sign, printed in block letters (at least two-inches in height) that sharply contrast with the background and reads, "Bottom floor - get off".

- (b) If a light, rated at least forty watts.

- (5) An electronic warning buzzer must be installed 5 feet above the bottom landing on the down side of the belt to warn belt riders of the approaching landing. This warning buzzer must be automatically activated by load weight on a step.

WAC 296-96-11070 Can you carry tools and materials on a belt manlift?

- (1) No freight or packaged goods may be carried on any manlift;
- (2) No pipe, lumber, or other construction materials may be handled on any manlift; and
- (3) No tools except those which will fit entirely within a pocket of ordinary working clothes may be carried on any manlift, except as follows:

- (a) Tools may be carried in a canvas bag not larger than 11 inches by 13 inches;
- (b) The bag must have a leather bottom; and
- (c) The bag must have loops or handles to be carried in the passenger's hand while riding the manlift. Shoulder straps are prohibited.

WAC 296-96-11078 What is required for belt manlift inspections?

- (1) All manlifts must be inspected by a qualified person, designated by the lift's owner, at least once every 30 days.
- (2) The inspection must cover (but is not limited to) the following items:
 - Belt and belt tension
 - Bottom (boot) and pulley
 - Brake
 - Clearance
 - Drive pulley
 - Driving mechanism
 - Electrical switches
 - Guardrails
 - Handholds and fastenings
 - Lubrication
 - Motor
 - Pulley supports
 - Rails, rail supports and fastenings
 - Rollers and slides
 - Signal equipment
 - Steps and fastenings
 - Warning signs and lights
- (3) A written record must be kept of results of each inspection, and it must be made available to all inspectors.

Hand-powered Manlifts

WAC 296-96-14010 What is the scope and application of the department's hand-powered manlift rules?

WAC 296-96-14010 through 296-96-14080 apply to the installation, design, and use of all one-person capacity, hand powered, counterweighted elevators that must be inspected according to chapter 70.87 RCW.

WAC 296-96-14020 What construction requirements apply to hoistway landings and entrances?

- (1) Every hoistway landing must be protected on all sides other than the landing opening side with a standard guard rail and intermediate guard rail. All landing except the bottom landing must have a toe board installed on all sides except the landing opening side.
- (2) All hoistway entrances must be not less than 6 feet 6 inches in height and in no case may the width exceed the corresponding car dimensions.
- (3) All hoistway entrances must be provided with an approved maze or with a hoistway gate which must:

- (a) Be at least 36 inches in height;
 - (b) Extend downward to within one inch of the landing sill;
 - (c) Be of the self-closing type, designed to swing horizontally out from the hoistway and closing against a full jam stop;
 - (d) Be located within 4 inches of the edge of the landing sill;
 - (e) Have a "DANGER" sign conspicuously posted on the landing side of the hoistway gate; and
 - (f) Withstand a 250 pound horizontal thrust.
- (4) On new installations, all projections extending inwardly from a hoistway enclosure at the entrance side of the car platform must be beveled and guarded on their underside by a smooth solid material set at an angle of not less than 60 degrees nor more than 75 degrees from the horizontal when cars are not equipped with gates.

WAC 296-96-14025 What are acceptable hoistway clearances?

- (1) The minimum clearance between a car side and the hoistway enclosure is one inch.
- (2) The clearance between a car platform and a landing sill must be at least 1/2 inch but not more than 1 1/2 inches.

WAC 296-96-14030 Can there be a habitable space beneath an elevator hoistway or counterweight shaft?

There must not be habitable space below an elevator hoistway or counterweight shaft unless the floor above the space can withstand the impact of a freely falling hoistway car or counterweight dropping on it.

WAC 296-96-14035 What construction requirements apply to hoistway guide rails?

- (1) There must be a minimum of two opposing guide rails extending to a point six inches beyond the full height of travel of the car when the counterweight buffer is fully compressed.
- (2) All rails must be attached by bolts, lag screws or other approved methods to a vertical supporting member which must not exceed 1/2 inch deflection with the application of a 250 pound horizontal thrust at any point.
- (3) Wood guide rails must be at least 1 1/2 inch by 1 1/2 inch vertical grain fir or equivalent and must not vary more than 3/16 inch in thickness on the sides which the brakes contact. All joints must be kept smooth and even.

WAC 296-96-14040 What installation requirements apply to buffer springs?

- (1) All new installations must have spring buffers installed below the car and counterweights.
- (2) All installations must have spring buffers attached below the counterweights.
- (3) Hoisting ropes must not allow a car platform to be more than 8 inches above the top landing when the counterweight buffer spring is fully compressed.

WAC 296-96-14045 What construction specifications apply to hoistway cars?

- (1) The car must be built to the following specifications:
 - (a) The car platform must be no greater than 30 inches on either side (6.25 square feet area).
 - (b) The car frame and platform must be of steel or sound seasoned wood construction and be designed with a safety factor of not less than 4 for metal and 6 for wood, based on a maximum capacity of 250 pounds.

- (c) All frame members must be securely bolted, riveted or welded and braced. If bolted, lock washers or lock nuts must be used.
- (d) Where wooden frame members are bolted, large washers or metal plates must be used to minimize the possibility of splitting or cracking the wood.
- (2) The sides of the car must be enclosed by a minimum of 2 safety guard rails with the top rail not less than 36 inches nor more than 42 inches from the car floor. Rails must sustain a horizontal thrust of 250 pounds. If solid material is used, it must be smooth surfaced and not less than 1/2 inch thickness, if wood; not less than 16 gauge thickness, if steel; and must be constructed from the car floor to a height of not less than 3 feet.
- (a) Where the hoistway is not enclosed on the entrance side of the car, a self-locking or drop bar gate must be provided. The car gate may be of the folding type, horizontally swung, provided it swings into the car enclosure. Drop bar gates must be of two bar construction, parallelogram type, and conform to requirements specified for car guard rails.
- (b) The car gate must drop into locking slots or be provided with a positive locking type latch capable of withstanding 250 pounds horizontal thrust.
- (3) Every car must have a substantial protective top. The front half may be hinged. The protective top may be made from No. 9 U.S. wire gauge screen, No. 11 gauge expanded metal, No. 14 gauge sheet steel, 3/4 inch or heavier plywood. If made of wire screen or metal, the openings must reject a 1/2 inch diameter ball.
- (4) Every car must have a proper rack to hold the balance weights.
- (5) A sign bearing the following information must be conspicuously posted within the car:
 - (a) Total load limit in pounds;
 - (b) "Maximum capacity one person"; and
 - (c) "For authorized personnel use only."
- (6) Every car must be equipped with a spring loaded foot brake which:
 - (a) Operates independently of the car safeties;
 - (b) Operates in both directions and will stop and hold the car and its load; and
 - (c) Locks the car in its position automatically whenever the operator releases the pressure on the foot pedal.
- (7) Every car must be equipped with a car safety device which:
 - (a) Applies to the sides of the main guide rails; and
 - (b) Stops and holds the car and its load immediately when the hoisting rope breaks.
- (8) Every car must have a minimum clearance of 6 feet 6 inches from the top of the car platform to the bottom edge of the crosshead or any other obstruction.
- (9) A tool box with minimum dimensions of 4 inches long by 3 inches deep must be provided and firmly attached to the car structure.

WAC 296-96-14050 What are the requirements for assembly, installation, and operation of sectional counterweights?

- (1) The assembly of sectional counterweights must conform to the following requirements:
 - (a) Rectangular counterweights must be held together by at least two tie rods 1/2 inch in diameter fastened with lock washers and double nuts or other approved means.
 - (b) One 3/4 inch rod may be used to hold the sections of a round counterweight together. Any additional sections or weights must be secured by an approved means.

(2) The eye bolt for the rope hitch must be attached to the counterweight in a manner that will prevent the eye bolt from coming loose. The eye of eye bolts must be welded to prevent it from opening.

(3) Every counterweight runway must be enclosed with substantial unperforated material for its full distance of travel. Inspection openings must be provided at either the top or bottom of the counterweight runway. These openings must be substantially covered at all times except when actually being used for inspection of counterweight fastenings.

(4) Workers must load the counterweight for the proper balance of the heaviest person using the elevator and others must use compensating weights, which must be available, to maintain a balance.

(5) On elevators with travel of 75 feet or more, a compensating chain or cable must be installed to maintain the proper balance of the counterweight to the car and load in all positions.

WAC 296-96-14055 What is the minimum acceptable sheave diameter?

The minimum sheave diameter must be 40 times the diameter of the rope used. For example, a 3/8 inch rope requires a 15 inch sheave.

WAC 296-96-14060 What requirements apply to hoisting ropes?

(1) Hoisting ropes must be of good grade traction elevator wire rope and must:

(a) Be not less than 3/8 inch in diameter;

(b) Provide a safety factor of 5 based on the maximum weight supported;

(c) Be of sufficient length to prevent the counterweight from striking the overhead structure when car is at bottom, and prevent the car from striking the overhead before the counterweight is at its lower limit of travel;

(d) Be fastened at each end by at least 3 or more clamps, with the "U" of the clamp bearing on the dead end of the rope; and

(e) Where passed around a metal or other object less than three times the diameter of the cable, have a thimble of the correct size inserted in the eye.

(2) Approved sockets or fittings with the wire properly turned back and babbitted may be used in place of clamps noted in subsection (1)(d) of this section.

WAC 296-96-14065 What requirements apply to operating ropes?

The operating rope must be of soft hemp or cotton at least 3/4 inch in diameter. It must be securely fastened at each end and must be in proper vertical alignment to prevent bending or cutting where it passes through the openings in the platform or the protective top of the car.

WAC 296-96-14070 Where must hoistway lights be located? Adequate lighting must be installed and operating at each landing and in the shaftway.

WAC 296-96-14075 What is the factor of safety for overhead supports? The overhead supporting members must be designed, based upon impact loads, with a safety factor of:

(1) Nine if wood; and

(2) Five if steel.

WAC 296-96-14080 What additional requirements apply to the installation and operation of hand powered manlifts?

- (1) Only employees and other authorized personnel may ride in a lift car.
- (2) Escape ladders must be installed extending the full length of the hoistway and must be located in a position so that in an emergency a person can safely transfer from the car platform to the ladder. An "IMPAIRED CLEARANCE" sign must be posted at the bottom of a ladder when the face of the ladder is less than 30 inches from any structure.
- (3) An automatic safety device which will prevent the car from leaving the landing until manually released by the operator must be installed at the bottom landing.
- (4) A fire extinguisher in proper working condition must be available in the car.
- (5) A five-year full load test must be performed and documentation submitted to the department. Manlifts with wooden rails must perform a no-load drop test.
- (6) An annual no load test must be performed and a tag with the date and company conducting the test must be attached to the conveyance.

Casket Lifts

WAC 296-96-16010 What is the scope of the department's casket lift regulations?

- (1) The rules in this section, WAC 296-96-16010 through 296-96-16240, apply to hoisting and lowering mechanisms equipped with cars that:
 - (a) Move within guides in a substantially vertical direction;
 - (b) Have a maximum net inside area of 28 square feet;
 - (c) Have a maximum total internal height of 4 feet and a maximum total internal width of 3 1/2 feet; and
 - (d) Utilize a series of rollers as a platform to exclusively carry caskets.
- (2) A hoistway, hoistway enclosure, and related construction that are in substantial compliance with Part 1, Section 100 of the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1 and meet the requirements of these casket lift rules.

WAC 296-96-16020 What requirements apply to the location and operation of machine rooms and machinery space?

- (1) Machines and control equipment can be located:
 - (a) Inside a hoistway enclosure, at the top or bottom, without enclosures or platforms; or
 - (b) Outside a hoistway if enclosed with a noncombustible material to a height of at least 6 feet.
- (2) Machines and control equipment located outside the hoistway must be enclosed in enclosures of incombustible material not less than 6 feet high and have a self-closing and locking door. Control equipment located outside the hoistway may be enclosed in metal cabinet equipped with a self-closing and locking door to prevent access by unauthorized persons.
- (3) Permanent electric lighting must be provided in all machine rooms and machinery spaces.

WAC 296-96-16030 What equipment can be located in a machine room? Only machinery and equipment required for the operation of the elevator is permitted in the elevator machine room.

WAC 296-96-16040 What requirements apply to the location of electrical wiring, pipes and ducts in hoistways and machine rooms?

(1) Only electrical wiring raceways and cables directly related to an elevator's operation may be installed inside the hoistway.

(2) Pipes or ducts that convey gases, vapors, or liquids and are not used in connection with the elevator must not be installed in any hoistway, machine room, or machinery space.

(3) Machinery and sheave beams, supports, and foundations must comply with the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1, Section 105.

WAC 296-96-16050 Is a pit required in a casket lift hoistway?

A pit is not required in a casket lift hoistway.

WAC 296-96-16060 What requirements apply to the size and location of hoistway door openings?

(1) The width and height of door openings must not exceed the width and height of the elevator car by more than one inch in each dimension; except one door opening may be of sufficient size to permit installing and removing the car, but must not be more than 4 feet 9 inches in height.

(2) The bottom of the door opening must be not less than 24 inches above the floor.

WAC 296-96-16070 How must hoistway doors be hung?

Hoistway doors must be hung and guided in such a manner that the doors will not be displaced from the guides or tracks when in normal service nor when the doors are subjected to a constant horizontal force of 250 pounds applied at right angles to and approximately the center of the door or to the center of each door section where multi-section doors are used.

WAC 296-96-16080 Where must hoistway doors be located?

Hoistway doors must be located so that the distance from the hoistway face of the doors to the landing sill must not be more than 2 1/2 inches.

WAC 296-96-16090 What requirements apply to hoistway doors locks?

All hoistway doors must be equipped with a combination mechanical lock and electric contact.

WAC 296-96-16100 How should space beneath a hoistway be protected?

Where the space below the hoistway is used for a passageway or is occupied by a people, or if unoccupied is not secured against unauthorized access, the cars and counterweights must be equipped with safeties which may be operated as a result of the breaking of the suspension means. Safeties may be of the inertia type without governors.

WAC 296-96-16110 What requirements apply to car doors and gates?

There must not be more than two entrances to the car.

(1) Each entrance must be provided with a car door or gate which when in a fully-closed position must protect the full width and height of the car entrance opening.

(2) Collapsible type gates, when in a fully closed position, must reject a 4 1/2 inch diameter ball.

WAC 296-96-16120 What requirements apply to car enclosures?

- (1) Elevator cars must be permanently enclosed on all sides and the top.
- (2) The enclosure must be securely fastened to the car platform and so supported that it cannot loosen or become displaced in ordinary service.
- (3) The enclosure walls must be of sufficient strength and designed and supported so that when subjected to a pressure of 75 pounds applied horizontally at any point on the walls of the enclosure, the deflection will not reduce the running clearance to exceed one inch.
- (4) The top of the car enclosure must be designed and installed so as to be capable of sustaining a load of 300 pounds on any square area 2 feet on a side and 100 pounds applied at any point. Simultaneous application of these loads is not required.

WAC 296-96-16130 What requirements apply to the construction of car frames and platforms?

- (1) Every elevator suspended by wire ropes must have a car frame consisting of a crosshead, uprights (stiles), and a plank located approximately at the middle of the car platform and in no case farther from the middle than one-eighth of the distance from the front of the platform.
- (2) Car frames must be guided on each guide rail by upper and lower guiding members attached to the frame.
- (3) Car frames and outside members of the platform must be made of steel.

WAC 296-96-16140 How must car frames and platforms be connected?

Connections between members of the car frames and platform must be riveted, bolted, or welded and must meet the following specifications:

- (1) Bolts where used through sloping flanges of structural members must have boltheads of the tipped head type or must be fitted with beveled washers.
- (2) Nuts used on sloping flanges of structural members must seat on beveled washers.
- (3) Welding of parts upon which safe operation depends must be done in accordance with the appropriate standards established by the American Welding Society.

WAC 296-96-16150 What is the load capacity of a casket lift car?

- (1) Driving machines, car and counterweight suspension mechanisms, and overhead beams and supports must be able to sustain a car with a structural load capacity based upon its inside net platform area as shown in American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1, Table 207.1.
- (2) A metal plate which gives the rated load in letters and figures not less than 1/4 inch high stamped, etched or raised on the surface of the plate must be fastened in a conspicuous place in the car.

WAC 296-96-16160 What types of casket lift driving machines are allowed?

Only drum, traction or plunger type driving machines may be used.

WAC 296-96-16170 What material and grooving is required for sheaves and drums?

Material and grooving for sheaves and drums must be of metal finished grooves and have a pitch diameter not less than 40 times the diameter of the rope.

WAC 296-96-16180 What types of brakes must be used on the driving machine?

Elevator driving machines must be equipped with a friction brake applied by a spring or springs and released electrically. The brake must be designed to have a capacity sufficient to hold the car at rest with its rated load.

WAC 296-96-16190 Where must terminal stopping devices be located?

- (1) Upper and lower normal stopping devices must be provided at the top and bottom of the hoistway.
- (2) Final terminal stopping devices must be provided and arranged to stop electric power to the elevator driving machine motor and brake after the car has passed a terminal landing but so that under normal operating conditions it will not function when the car is stopped by the normal terminal stopping device.
- (3) Elevators having traction machines must have final terminal stopping switches located in the hoistway and operated by cams attached to the car.
- (4) Elevators having winding-drum machines must have terminal stopping switches located on and operated by the driving machine, which must not be driven by chain, rope or belt. Also, stopping switches must be installed in the hoistway and operated by cams attached to the car or counterweights.
- (5) All elevators having winding-drum machines must have a slack rope device with an electric switch of the enclosed manually reset type which will cause the electric power to be removed from the driving machine motor and brake if the hoisting ropes become slack.

WAC 296-96-16200 What are the specifications for casket lift ropes and rope connections?

- (1) Elevator cars and counterweights must be suspended by steel wire ropes. Only iron (low carbon steel) or steel wire ropes with fibre cores, having the commercial classification of "elevator wire rope" may be used for the suspension of elevator cars and for the suspension of counterweights.
- (2) The minimum number of hoisting ropes is:
 - (a) Three 1/2 inch ropes for traction elevators; and
 - (b) Two 1/2 inch ropes for drum type elevators.
- (3) Fastenings must be by individual tapered babbitted rope sockets or by other department-approved types.
- (4) The rope sockets must be of a type which will develop at least 80 percent of the braking strength of the strongest rope to be used in such fastenings, and U-bolt type rope clips (clamps) must not be used for load line fastenings.

WAC 296-96-16210 What specific requirements apply to hydraulic elevators?

- (1) All hydraulic elevators must be a plunger type with the plunger securely attached to the car platform.
- (2) Plungers composed of more than one section must have the joints designed and constructed to carry in tension the weight of all plunger sections below the joints.
- (3) Plungers must be provided with solid metal stops to prevent the plunger from traveling beyond the limits of the cylinder. Stops must be designed and constructed so as to stop the plunger from maximum speed in the "up" direction under full pressure without damage to the hydraulic system.
- (4) Any leaking hydraulic oil must be collected.

WAC 296-96-16220 What requirements apply to valves, supply piping, and fittings?

- (1) Valves, piping and fittings must not be subjected to working pressures that exceed manufacturer recommendations.
- (2) Pipes, especially those that may vibrate, must be sufficiently supported at each joint and fitting so undue stress is eliminated.
- (3) A shut-off valve must be installed in the pit.
- (4) Each pump must be equipped with a relief valve and all relief valves must be:
 - (a) Located between the pump and check valve in a by-pass connection;
 - (b) A type that cannot be shut off from the hydraulic system; and
 - (c) Pre-set to open at a pressure not greater than 125 percent of the working pressure at the pump.

EXCEPTION: Relief valves are not required for centrifugal pumps driven by an induction motor when the shut-off or maximum pressure that the pump develops is no more than 135 percent of the working pressure at the pump.

- (5) A check valve must be installed that will hold a car and its rated load at any point whenever a pump stops or pump operating pressure drops below the required minimum.

WAC 296-96-16230 What type of stopping devices must be installed?

Normal stopping devices operated by cams attached to the car must be installed at the top and bottom of the hoistway. Final terminal stopping devices and anti-creep leveling devices are not required.

WAC 296-96-16240 What type of operating devices must be used?

Only constant pressure or automatic type operating devices located outside the hoistway may be used.

Boat Launching Elevators

WAC 296-96-18010 What are the definitions for boat launching elevators?

"Boat launching elevator" is a device that:

- (1) Is equipped with a car or platform;
- (2) Moves in guides in a substantially vertical direction;
- (3) Serves to connect one or more floors or landings of a boat launching structure with a beach or water surface; and
- (4) Is used for carrying or handling boats in which people ride.

"Boat launching structure" is any structure that houses and supports any boat launch elevator.

WAC 296-96-18020 Must boat launching elevator cars and platforms be enclosed?

All boat launching elevator cars or platforms must be enclosed to a height of at least 6 feet from the floor on all sides where there are no hoistway doors or gates. Enclosures may be built as solid panels or open work which will reject a two inch diameter ball.

WAC 296-96-18030 What electrical wiring requirements apply to boat launching elevators?

- (1) All electric wiring used in boat launching elevators, except the traveling cable, must be enclosed in rigid metal conduit.
- (2) The traveling cable, which is required between the car mounted terminal stopping switch and the hoistway, must be made of flexible, nonmetallic, moisture-retardant, flame-retardant material.
- (3) All electrical outlets, switches, junction boxes and fittings used in boat launching elevators must be weather proof.

WAC 296-96-18040 What type of brakes must be used on boat launching elevators?

All electric boat launching elevators must be equipped with effective brakes that are applied by springs and released electrically. Brake capacity must be sufficient to hold the elevator and its rated load at rest.

WAC 296-96-18050 What types of stop switches and protective devices are required on boat launching elevators?

- (1) All electric boat launching elevators must be equipped with:
 - (a) A bottom terminal stop switch operated by the traveling cable and a float or some other department approved mechanism;
 - (b) A top terminal stop switch that is located in the hoistway and is operated either by a cam attached to the car or some other department approved mechanism; and
 - (c) Key-operated, continuous pressure type operating switches that are located outside the hoistway but within sight of the elevator car or platform.
- (2) All boat launching elevators operated by a winding drum, must be equipped with a final stop switch that is located on and operated directly by the driving machine. Chains, ropes or belts must not drive final stop switches.
- (3) All boat launching elevators driven by a polyphase alternating current motor must be equipped with the following approved relays:
 - (a) A reverse phase relay that prevents the driving machine motor from starting when either the phase rotation is in the wrong direction or there is a phase failure; and
 - (b) A main line relay or contact that automatically stops power to the driving machine motor and brake, activating the brake when any safety device is activated.
- (4) Hand rope controls must not be used on any boat launch elevator.

WAC 296-96-18060 When must hoisting cables be re-shackled or refastened?

The load end of a hoisting cable on all boat launching elevators must be re-shackled or refastened every 12 months.

WAC 296-96-18070 What requirements apply to hoistway gates and doors?

- (1) All boat launching elevators must have gate-protected hoistway entrances at every landing except those landings located on the beach or at the water surface.
- (2) All gates must comply with the following minimum requirements:
 - (a) There must be a full-bodied, balanced type safety gate that protects the full width of the hoistway and must hang, at all points along the gate, within two inches of the landing threshold;

- (b) The minimum gate height on top landings is 42 inches and 66 inches on all intermediate landings;
- (c) Gates must be constructed of either metal or wood;
- (d) Gates must be capable of withstanding a lateral pressure, applied at any point, of 250 pounds without breaking, becoming permanently deformed or being displaced from their guides or tracks;
- (e) The openings in grille, lattice or other openwork designed gate bodies, must reject a two-inch diameter ball; and
- (f) Gates must be equipped with a department approved combination electric contact and mechanical lock.

WAC 296-96-18080 Must boat launching elevator hoistways be enclosed?

The sides of elevator hoistways adjacent to a dock area platform, walkway or ramp must be enclosed. The enclosures must comply with the hoistway safety gate dimension and pressure requirements in WAC 296-96-18070.

Mechanized Parking Garage Equipment

WAC 296-96-20005 What national safety codes has the department adopted for mechanized parking garage equipment?

The department has adopted USASI Standard A113.1-1964 "Safety Code for Mechanized Parking Garage Equipment."

Part D - Regulations for Existing Elevators, Dumbwaiters, and Escalators

Regulations for Existing Electric Elevators, Direct Plunger and Roped Hydraulic Elevators, Escalators used to transport passengers, Electric and Hand-powered Dumbwaiters, Hand-powered Elevators, Inclined Stairway Chairlifts, Inclined and Vertical Wheelchair Lifts, and Sidewalk Elevators

NOTE: The following rules set the minimum standard for existing elevators, dumbwaiters, and escalators, and, where applicable, alterations.

WAC 296-96-23100 Are keys required to be onsite?

Yes. The keys to the machine room that are necessary to operate the elevator must be readily available to authorized personnel.

NOTE: The department recommends the use of a locked key retainer box in the elevator lobby at the designated level above the hall buttons or by machine room doors at no more than 6 feet above the floor. This key retainer box should be:

- Readily accessible to authorized personnel;
- Clearly labeled "Elevator"; and
- Equipped with a 1-inch cylinder cam lock key #39504.

The department further recommends that:

- Keys for access to elevator machine rooms and for operating elevator equipment are tagged and kept in the key box.
- The key box contains all keys necessary for inspections of the elevator.
- Mechanical hoistway access devices are kept in the machine room.

Subpart I

Hoistways and Related Construction for Electric and Hydraulic Elevators

WAC 296-96-23101 What is the scope of Subpart I?

Subpart I, Hoistways and Related Construction for Electric and Hydraulic Elevators, is the minimum standard for all existing hydraulic and electric elevators. It applies to other equipment only as referenced in the applicable part.

Section 1 Hoistways

WAC 296-96-23110 What structural requirements apply to hoistway enclosures?

- (1) Local laws and ordinances establish fire-resistant requirements for hoistway enclosures.
- (2) When doors and hoistway enclosures are not required to be fire resistant, the hoistway must be enclosed:
 - (a) With a solid material or a material with openings that will reject a 1/2 inch diameter ball; and
 - (b) To a height at least 6 feet above each floor or landing and any adjacent stairways treads.
- (3) Hoistway enclosures must be supported and braced so as to deflect no more than one inch when subjected to a 100 pound force perpendicularly applied at any point.

(4) Hoistway enclosures adjacent to counterweights must extend the full height of the floor and 6 inches past the counterweight raceway.

WAC 296-96-23111 Are guards required for windows in hoistway enclosures?

(1) Guards are required on outside hoistway windows if the windows are located:

- (a) Ten stories or less above a thoroughfare; or
- (b) Three stories or less above the roof of an adjacent building.

(2) Hoistway windows can be guarded by one of the following methods:

- (a) By vertical bars at least 5/8 inch in diameter or equivalent, spaced no more than 10 inches apart, permanently and securely fastened in place; and
- (b) By metal-sash windows having solid section steel muntins of no less than 1/8 inch thickness, spaced no more than 8 inches apart.

(3) Exterior hoistway windows must be identified with 4-inch high letters marked "elevator."

WAC 296-96-23113 What are the requirements for pipes in hoistways that convey gases, vapors, or liquids?

(1) All steam and hot water pipes in a hoistway must be covered to prevent direct spray onto the elevator car if ruptured, as required in ASME A17.1, Rule 102.2.

(2) All other pipes or ducts currently in a hoistway must be securely fastened to prevent excessive vibration.

(3) Future pipes or ducts must not be installed in a hoistway unless they directly pertain to the elevator's operation.

WAC 296-96-23115 What safety requirements apply to inspecting and maintaining overhead sheaves?

(1) Overhead sheave spaces requiring inspection and maintenance must be located so adequate access and decking is available to insure the safety of inspection and maintenance personnel.

(2) Guardrails must be installed where decking does not cover the complete hoistway.

(3) Guardrail and deck supports must be similar to those required for the top of an elevator car and may be made of either wood or metal compatible with the existing hoistway construction.

(4) Inspections and maintenance may be performed from the top of an elevator car if a ladder is not required to perform these functions.

WAC 296-96-23116 What requirements apply to car numbers?

In any building with more than one elevator, numbers at least two inches in height identifying each car must be located at the main lobby entrance, inside the car, on the machine, and on the disconnect switch.

Section 2 Machine Rooms and Machinery Spaces

WAC 296-96-23121 What are the requirements for machine room and machinery space access?

Access doors to machine rooms and machinery spaces must be kept closed and locked. The lock must be a spring type which is installed to permit the door to be opened from the inside without a key.

WAC 296-96-23122 What type of lighting must be installed in machine rooms and machinery space?

Permanent electric lighting must be provided in all machine rooms and machinery spaces. The illumination must be at least 10 foot-candles at floor level.

WAC 296-96-23123 What type of service outlets must be installed in elevator cars, hoistways and machinery spaces?

Service outlets, where provided, must be permanently grounded.

WAC 296-96-23124 What installation requirements apply to pipes conveying gases, vapors, or liquids in machine rooms and machinery spaces?

- (1) All pipes or ducts currently in machine rooms and machinery spaces must be securely fastened to prevent excessive vibration.
- (2) Future pipes or ducts must not be installed in machine rooms and machinery spaces.

WAC 296-96-23125 Must elevator machines and control equipment be protected from the weather?

Elevator machines and control equipment must be protected from the weather.

WAC 296-96-23126 What protective measures should be taken in hoistways, machine rooms and machinery spaces to insure safety?

- (1) Gears, sprockets, sheaves, cables, tapes, belts and chains must be fitted with suitable guards to prevent accidental contact, where feasible.
- (2) Openings in machine room floors above the hoistway must be guarded to prevent tools from falling into the hoistway below.
- (3) Ventilation grids where exposed to the hoistway below must be firmly bolted or secured to prevent accidental removal and must be fitted with 1/2 inch wire mesh under the grid.

Section 3 Pits

WAC 296-96-23130 What requirements apply to pit access?

- (1) Pits must be accessible to all authorized personnel.
- (2) Access doors, if provided, must be kept closed and locked.
- (3) Access ladders must be installed in elevator pits 3 feet or deeper.

WAC 296-96-23131 What requirements apply to pit drains?

- (1) Pit drains directly connected to sewers are prohibited.
- (2) Sumps, with or without pumps, are permitted.

WAC 296-96-23132 What lighting requirements apply to pits? (1) A permanent lighting fixture producing at least 5 foot-candle at the pit floor must be installed in all pits.

- (2) A light switch must be installed and must be accessible from the pit access door.
- (3) A permanent grounded outlet must be provided in all pits.

WAC 296-96-23133 What requirements apply to counterweight pit guards?

(1) Where feasible, unperforated metal guards must be installed in the pit on the open side or sides on all counterweights where spring or solid-type buffers are used or where oil buffers attached to the counterweights are used. Except, where compensating chairs or ropes are attached to the counterweight the guard may be omitted on the side facing the car to which the chains or ropes are attached.

(2) Guards must extend from a point no more than 12 inches above the pit floor to a point at least 7 feet but not more than 8 feet above the floor; and be fastened to a properly reinforced and braced metal frame that is at least equal in strength and stiffness to No. 14 U.S. gauge sheet steel.

Section 4 Protection of Space Below Hoistways**WAC 296-96-23140 What requirements apply to any space below a hoistway that is not permanently protected from access?**

When space below a hoistway is not permanently protected from access, the following requirements apply:

(1) Counterweights must be equipped with safeties.

(2) The cars and counterweight must be equipped with spring or oil buffers.

(3) The car and counterweight buffer supports must be sufficiently strong to withstand without permanent deformation contact with buffers traveling at the following speeds:

(a) The governor tripping speed where the safety is governor operated; or

(b) 125 percent of the rated speed when the safety is not operated by a governor.

Section 5 Hoistway Entrances**WAC 296-96-23150 Are hoistway doors (gates) required?**

(1) Passenger elevators. Hoistway landing openings must have entrances which guard the full width and height of the openings. The panels of entrances used with automatic-operation passenger elevators must not have hand latches or other hand operated door fastening devices, nor must such panels

(2) Freight elevators. Hoistway landing openings for freight elevators must have entrances which guard the full width of the opening. Gates and doors must meet the following requirements:

(a) Balanced type vertically sliding hoistway gates must extend from a point not more than 2 inches from the landing threshold to a point at least 66 inches above the threshold.

(b) Gates must be solid or openwork of a design that will reject a 2 inch diameter ball and be located so that the distance from the hoistway face of the gate to the hoistway edge of the landing sill is no more than 2 1/2 inches.

(c) Gates must be constructed of metal or wood and be designed and guided so as to withstand a lateral pressure of 100 pounds applied at approximately the center without breaking or becoming permanently deformed and without displacing the gate from its guides or tracks.

(d) At the top landing, a gate 66 inches high may be used if there is not sufficient clearance for a 6 feet high gate. When the requirements of WAC 296-96-23110 allow nonfire-resistive hoistway enclosures, a gate may be used.

(e) Gates must be constructed of either metal or wood.

- (f) Gates must withstand a lateral pressure of 100 pounds, applied at approximately their center, without breaking, being permanently deformed or being displaced from their guides or tracks.
- (g) The maximum vertical opening between a landing sill and a door or gate is 2 inches.
- (h) The distance between the gate's hoistway face and the hoistway landing edge must not exceed 2 1/2 inches.

WAC 296-96-23151 What requirements apply to hoistway door closing devices?

- (1) Horizontally sliding doors on automatic-operation elevators must be equipped with door closers that automatically close an open door if the car for any reason leaves the landing zone.
- (2) Horizontal swinging single or center-opening doors on automatic-operation elevators must be self-closing.
- (3) Door closers are not required for the swinging portion of combination horizontally sliding and swinging doors.

WAC 296-96-23152 What requirements apply to hoistway door vision panels?

- (1) Manually operated or self-closing hoistway doors of the vertically or horizontally sliding type for elevators with automatic or continuous-pressure operation must be provided with a vision panel except at landings of automatic-operation elevators where a hall position indicator is provided.
- (2) In multi-section doors, the vision panel is required in one section only but may be placed in all sections.
- (3) All horizontally swing doors must have vision panels.
- (4) Vision panels may be provided in any type of hoistway door regardless of the type of operation of the elevator. Where provided, vision panels must meet the following requirements:
 - (a) The area of any single vision panel must be at least 25 square inches with the total area of one or more panels in any hoistway door not exceeding 80 square inches.
 - (b) Each clear panel opening must reject a 6 inch diameter ball.
 - (c) Muntins between panel sections must be made of a noncombustible material and of substantial construction. If located on the landing side, they must be flush with the surface of the landing side of the door.
 - (d) Panel openings must be glazed with clear wire glass at least 1/4 inch thick.
 - (e) A panel's center must be located at least 54 inches but no more than 66 inches above the landing except, for vertically sliding, biparting, counterbalanced doors it must be located to conform with the dimensions specified to the extent that the door design will permit.
 - (f) Vision panels in horizontally swing doors must be located for convenient vision when opening the door from the car side.
 - (g) Wire-glass panels in power-operated doors must be substantially flush with the surface of the landing side of the door.
 - (h) Vision panel frames must be secured by means of nonreversible screws or other tamper proof fasteners.
 - (i) Vision panels which do not meet the requirements of (a) through (h) of this section must be protected by protective grilles made of No. 15 gauge stainless or galvanized steel in accordance with the following specifications:
 - (i) Grilles must be sized to fit within or over the vision panel frame and completely cover the vision panel opening in the hoistway door.
 - (ii) Grilles must be secured by means of nonreversible screws or other tamper proof fasteners.

- (iii) Grilles must contain openings which are no larger than 3 inches by 3/4 inch, or 3 inches in diameter.
- (iv) All edges must be beveled and free of burrs.
- (v) Grilles must be installed on the hoistway side of the door.

WAC 296-96-23153 What requirements apply to door hangers for horizontal slide doors?

Door hangers for horizontal slide type entrances must meet the following requirements:

- (1) Means must be provided to prevent the hangers from jumping the track.
- (2) Stops must be provided in the entrance assembly to prevent hangers from overrunning the end of the track.
- (3) Power-operated doors must be built to withstand, without damage or appreciable deflection, an imposed static load equal to four times the weight of each panel. This static load must be applied successively downward and upward along the vertical centerline of the panel.

WAC 296-96-23154 Are astragals required?

On a vertically sliding, biparting, counterbalanced hoistway door, a fire-resistive, nonshearing and noncrushing member of either the meeting or overlapping type must be provided on the upper panel to close the distance between the rigid door sections when in contact with the stops. Rigid members which overlap the meeting edge and center-latching devices are prohibited.

WAC 296-96-23155 What requirements apply to pull straps?

Manually operated, vertical slide, biparting elevators doors which can be operated from the landings must be provided with pull straps on the inside and outside of the upper panel where the lower edge of the upper panel is more than 6 feet 6 inches above the landing when the panel is in the fully open position. The length of the pull straps must be as follows:

- (1) The bottom of the strap must be not more than 6 feet 6 inches above the landing when the panel is in the fully opened position.
- (2) The length of the strap must not be extended by means of ropes or other materials.
- (3) Where pull straps are provided on the car side of doors of elevators which can be operated from the car only, the length of the pull straps must conform to the requirements specified in (1) and (2) of this section.

WAC 296-96-23156 What requirements apply to landing sill clearances?

The clearance between the car-platform sill and the hoistway edge of any landing sill, or the hoistway side of any vertically sliding counterweighted, or of any vertically sliding counterbalanced biparting hoistway door, must be:

- (1) At least 1/2 inch where side car guides are used.
- (2) At least 3/4 inch where corner car guides are used.
- (3) In all cases, the maximum clearance must not be more than 1 1/2 inch.

WAC 296-96-23157 What is the maximum allowable threshold clearance? The maximum distance from the hoistway door or gate face to the hoistway edge of the threshold must not exceed 2 1/4 inches.

WAC 296-96-23158 What requirements apply to elevator floor numbers?

Elevator hoistways must have floor numbers at least 4 inches high and placed on the walls and/or doors of hoistways at intervals so that a person in a stalled elevator, upon opening the car door 4 inches, could determine the floor position

Section 6

**Hoistway Door Locking Devices,
Parking Devices, and Access**

WAC 296-96-23160 What requirements apply to hoistway door (gate) locking devices?

- (1) Passenger elevator hoistway doors or gates must be equipped with hoistway-unit system door interlocks.
- (2) Freight elevator hoistway doors or gates must be equipped with hoistway-unit system door interlocks or an approved type combination electric contact and mechanical lock.
- (3) Combination locks and electric contacts or interlocks must be located so not to be accessible from the landing side when the hoistway doors or gates are closed.

WAC 296-96-23161 What requirements apply to elevator parking devices?

- (1) Elevators that are operated from within the car only must have elevator parking devices installed at every landing that is equipped with an unlocking device.
- (2) On elevators that are not operated from within the car only, a parking device must be provided at one landing and may be provided at other landings. This device must be located at a height no greater than 6 feet 11 inches above the floor.
- (3) Parking devices are not required for elevators with hoistway doors that automatically unlock when the car is within the landing zone.
- (4) Parking devices must conform to the following specifications:
 - (a) They must be mechanically or electrically operated.
 - (b) They must be designed and installed so that friction or sticking or the breaking of any springs used in the device will not permit opening or unlocking a door when the car is outside the landing zone of that floor.
 - (c) Where springs are used, they must be of the restrained compression type which will prevent separation of the parts in case a spring breaks.

WAC 296-96-23162 What requirements apply to hoistway door unlocking devices?

Hoistway door unlocking devices or hoistway access switches must be provided on all elevators at one upper landing to permit access to the top of the car and at the lowest landing if this landing is the normal point of access to the pit. Hoistway door unlocking devices may be provided at all landings for emergency use.

- (1) Hoistway door unlocking devices must conform to the following specifications:
 - (a) The device must unlock and permit the opening of the hoistway door from the access landing regardless of the position of the car.
 - (b) The device must be designed to prevent unlocking the door with common tools.
 - (c) The operating means for unlocking the door must be available to and used only by inspectors, elevator maintenance and repair personnel, and qualified emergency personnel.
 - (d) The unlocking-device keyway must be located at a height no greater than 6 feet 11 inches above the floor.
- (2) Hoistway access switches must conform to the following specifications:

- (a) The switch must be installed only at the access landings.
- (b) The switch must be installed adjacent to the hoistway entrance at the access landing with which it is identified.
- (c) The switch must be of the continuous-pressure spring-return type and must be operated by a cylinder-type lock having not less than five-pin or five-disk combination with the key removable only when the switch is in the "off" position. The lock must not be operable by any key which will operate locks or devices used for other purposes in the building. The key or combination must be available to and used only by inspectors and elevator maintenance and repair personnel.
- (d) The operation of the switch at either access landing must permit and may initiate and maintain movement of the car with the hoistway door at this landing unlocked or not in the closed position, and with the car door or gate not in the closed position, subject to the following:
 - (i) The operation of the switch must not render ineffective the hoistway door interlock or electric contact at any other landing.
 - (ii) The car must not be operated at a speed greater than 150 feet per minute.
 - (iii) For automatic and continuous-pressure operation elevators: Landing operating devices of continuous-pressure operation elevators and car and landing operating devices of automatic operation elevators must first be made inoperative by means other than the access switch; and power operation of the hoistway door and/or car door or gate is inoperative.
 - (iv) Automatic operation by a car-leveling device is inoperative.
 - (v) The top-of-car operating device is inoperative.
 - (vi) The movement of the car initiated and maintained by the upper access switch must be limited in the down direction to a travel not greater than the height of the car crosshead above the car platform, and limited in the up direction above the upper access landing to the distance the car apron extends below the car platform. Where electrically operated switches, relays, or contractors are used to render inoperative the hoistway-door interlock or electric contact or the car door or gate electric contact, the control circuits must be arranged to conform to the requirements of WAC 296-96-23221 and in addition, to render the normal car and hall operation ineffective in any such switch, relay, or contractor fails to function in the intended manner.

Section 7

Power Operation of Doors and Gates

WAC 296-96-23165 What requirements apply to reopening devices for power-operated car doors and gates?

- (1) A power-operated car door or gate must have a reopening device that stops and reopens the door or gate and the adjacent hoistway door if the car door or gate is obstructed while closing. If the closing kinetic energy is reduced to 2 1/2 feet-lbf or less, the reopening device may be rendered inoperative.
- (2) For center opening doors or gates, the reopening device must be designed and installed so that obstruction of either door or gate panel when closing will cause the reopening device to function.

WAC 296-96-23166 What requirements apply to photo electric or electric eye door reopening devices?

An elevator equipped with a photo electric or electric eye device for reopening of the car and hoistway doors must be provided with a means that will automatically time-out and close the door if it has been obstructed for 20 seconds. The photo electric or electric eye device must not be reactivated until the doors have fully closed. There are two exceptions to this requirement:

- (1) The department may authorize hospitals or nursing homes to allow obstructed doors to close within 35 seconds after the expiration of the normal door open time.
- (2) When smoke detectors are used to bypass photo electric or electric eye devices the doors are not required to time-out and close except under phase I conditions as authorized by ANSI A17.1-211.3A.

Subpart II

Machinery and Equipment for Electric Elevators

WAC 296-96-23200 What is the scope of Subpart II?

Subpart II, Machinery and Equipment for Electric Elevators, is a minimum standard for all existing electric elevators. It applies to other equipment only as referenced in the applicable Subpart.

Section 1

Buffers and Bumpers

WAC 296-96-23203 What requirements apply to buffers and bumpers?

Car and counterweight buffers or bumpers must be provided. Solid bumpers may be used in lieu of buffers where:

- (1) The rated speed is 50 feet per minute or less; or
- (2) Type C safeties are used.

Section 2

Counterweights

WAC 296-96-23205 What requirements apply to counterweights?

On rod type counterweights, the rod nuts must be cotter-pinned and the tie rods must be protected so that the head weight cannot crush the tie rods on buffer engagement.

- (1) The weights must be protected so that they cannot be dislodged.
- (2) Compensating chains or ropes must be fastened to the counterweight from directly or to a bracket fastened to the frame and must not be fastened to the tie rods.

Section 3

Car Frames and Platforms

WAC 296-96-23206 What requirements apply to car platforms and frames? Every elevator car must have a platform consisting of a nonperforated floor attached to a platform frame supported by the car frame and extending over the entire area within the car enclosure.

- (1) Holes in the floor for the safety plank wrench, etc., must be covered and secured.

(2) The platform frame members and the floor must be designed to withstand the forces developed under the loading conditions for which the elevator is designed and installed.

WAC 296-96-23207 What requirements apply to platform guards (aprons)?

The entrance side of the platform of passenger and freight elevators equipped with leveling devices or truck-zoning devices must have smooth metal guard plates of not less than 0.0598 inch thick steel, or material of equivalent strength and stiffness, adequately reinforced and braced to the car platform and conforming to the following:

- (1) The guard plate must extend no less than the full width of the widest hoistway door opening.
- (2) It must have a straight vertical face, extending below the floor surface of the platform, of no less than the depth of the leveling of truck zone, plus 3 inches.
- (3) If new guards are installed, the lower portion of the guard must be bent back at an angle of not less than 60 degrees nor more than 75 degrees from the horizontal.
- (4) The guard plate must be securely braced and fastened in place to withstand a constant force of not less than 15-lbf applied at right angles to and at any position on its face without permanent deformation.

WAC 296-96-23208 What requirements apply to hinged platform sills?

Hinged platform sills, where provided, must have electric contacts which will prevent operation of the elevator by the normal operating device unless the hinged sill is within 2 inches of its fully retracted position. The elevator may be operated by the leveling device in the leveling zone with the sill in any position.

WAC 296-96-23209 What requirements apply to floating (movable) platforms?

Floating (movable) platforms which permit operation of the elevator when the car door or gate is not in the closed position are prohibited.

Section 4
Car Enclosures

WAC 296-96-23215 What requirements apply to car enclosures?

Car enclosures for freight and passenger cars must meet the following specifications:

- (1) Freight elevator cars:
 - (a) Cars must be enclosed to a height of at least 6 feet from the floor on the sides where there are no hoistway doors or gates with solid panel or openwork which will reject a 2 inch diameter ball.
 - (b) On the side of the car adjacent to the counterweight runway and extending 6 inches each side of the counterweight runway, the enclosure must extend to the car top or underside of car crosshead.
 - (c) If overhead protection is of openwork material, it must reject a 1 1/2 inch ball and shall be sufficiently strong to support 300 pounds applied at any point. Simultaneous application of these loads is not required.
 - (d) Suitable overhead protection may be installed directly over the area where the operator runs the controls, providing the overhead protection covers sufficient area for safe protection of the operator.

(2) Passenger elevator cars:

(a) Passenger elevator cars must be fully enclosed on all sides and the top, except the opening for entrances

(b) Enclosures must be of metal or wood in conformity with the local fire regulations.

(c) The car top must be sufficiently strong to support a load of 300 pounds applied at any point. Simultaneous application of these loads is not required.

WAC 296-96-23216 What requirements apply to the lining materials used on passenger car enclosures?

Materials used for passenger car linings must meet the following specifications:

(1) Carpeting without padding may be used for interior finishes provided that it has a Class I rating, a flame spread of 25 or less which must include all assembly components except the adhesive. The adhesive must be a slow-burning type.

(2) Slow-burning combustible materials, other than carpet, may be used for interior finishes provided the materials have a Class II rating or better (flame spread of 75 or less), which must include all assembly components other than the adhesive. Materials must be firmly bonded flat to the enclosure and must not be padded. Fabric with spray-type fireproofing must not be installed in elevators.

(a) Equivalent ratings in watts per centimeter squared as derived in the radiant panel test are also acceptable.

(b) .45 watts/cm squared or higher is equivalent to Class I or better.

(c) .22 watts/cm squared or higher is equivalent to Class II or better.

(d) In the radiant test, the higher the number the better the flame resistance.

(e) In the Class I and II system, the lower the number, the better the flame resistance.

(f) Smoke density of materials must be less than 450 when tested in accordance with UBC Standard No. 42.-1.

(3) Certification that the materials and assembly meet these requirements must be submitted to the building official.

WAC 296-96-23220 What requirements apply to car doors and gates? Car doors or gates are required at each entrance to the elevator car.

(1) Car doors or gates may be horizontal or vertical sliding.

(2) Gates, except collapsible, may be solid or may be openwork of a design to reject a 2 inch diameter ball. Gates must be:

(a) Constructed of metal or wood; and

(b) Designed so as to withstand a lateral pressure of 100 pounds applied at approximately the center without breaking or being permanently deformed and without displacing the gate from its guides or tracks.

(3) Collapsible gates must reject a 3 inch diameter ball when fully closed (extended position) when installed on passenger cars and must reject a 4 1/2 inch ball when fully extended when installed on freight cars. Such gates must not be power-opened for more than one-third of their clear opening distance or for a maximum power opening distance not to exceed 10 inches. Collapsible gates must have at least every fourth vertical member guided at the top and every second vertical member guided at the bottom.

- (4) Handles of manually operated collapsible gates nearest the car operating device on elevators operated from the car only must be located so that the nearest handle is not more than 48 inches from the car operating device when the gate is closed and not more than 48 inches above the car floor. Gate handles must be provided with finger guard.
- (5) Car doors and gates when in the fully closed position must meet the following specifications:
- (a) For passenger cars, they must protect the full width and height of the car entrance opening provided that vertically sliding gates may extend from a point not more than 1 inch above the car floor to a point not less than 6 feet above the floor.
- (b) For freight elevators, they must protect the full width of the car entrance opening. Car doors must extend from the car floor to a height of not less than 6 feet above the car floor. Vertically sliding gates must extend from a point not more than 1 inch above the car floor to a point not less than 6 feet above the car floor.
- (6) Car doors and gates of electric and electro-hydraulic elevators must be equipped with approved car door or gate electric contacts which will prevent operation of the elevator by the normal operating device unless the car door or gate is in the closed position.

WAC 296-96-23221 What requirements apply to the location of car doors and gates?

This section does not apply to freight elevators with horizontally swinging doors that are inaccessible to the general public and located in factories, warehouses, garages, and other similar buildings. All other elevators must meet the following requirements:

- (1) Doors or gates for automatic or continuous-pressure operation elevators must be located so that the distance from the face of the car door or gate to the face of the hoistway door is no more than the following:
- (a) Where a swinging-type hoistway door and a car gate are used, 4 inches.
- (b) Where a swinging-type hoistway door and a car door are used, 5 1/2 inches.
- (c) Where a sliding-type hoistway door and a car gate or door are used, 5 1/2 inches.
- (2) The distances specified must be measured as follows:
- (a) Where a multi-section car door and a multi-section hoistway door are used or where one of these doors is multi-section and the other is single section, between the sections of the car door and the hoistway doors nearest to each other.
- (b) Where a multi-section car door and a swinging-type hoistway door are used, between the hoistway door and the section of the car door farthest from it. Where space conditions require the use of three-speed car doors, the distance must be measured from the intermediate speed panel.
- (c) Where a car gate is used, between the car gate and the section of the hoistway door nearest to the car gate.
- (3) Where existing distances are greater than specified by paragraphs (1) and (2) of this section, a space guard of sheet metal must be provided, attached to the hoistway door and/or car door.
- (a) The guard is to be mounted to the door by a tamper-proof means.
- (b) The bottom of the guard must be no less than 1/8 inch nor more than 1/2 inch from the edge of the sill and must be no more than 1/2 inch above the sill.
- (c) The face of the guard must run vertically no less than 40 inches nor more than the height of the lower edge of the vision panel.
- (d) The guard must extend the full width of the door.
- (e) The top of the guard must be inclined toward the face of the door at an angle of no less than 60 degrees nor more than 75 degrees from the horizontal.

- (f) Exposed edges must be beveled or rolled to eliminate sharp edges.
- (g) The guard must be sufficiently rigid or reinforced to prevent collapsing or denting.
- (h) Mounting of the guard must have proper clearances at the bottom and sides to permit easy closing of the door and must not interfere with the self-closing.
- (i) On multi-section horizontally sliding doors only, the leading or fast panel must be fitted with the space guard. For swinging doors, the sides of the guard must be closed if the depth exceeds 5 inches.
- (4) On horizontally-sliding doors where existing clearances are greater than specified by subsections (1) and (2) of this section, a vertical sight guard must be mounted to the leading edge of the hoistway door. The sight guard must:
 - (a) Be mounted with a vertical clearance of no more than 1/2 inch to this sill to a height of no less than 6 feet; and
 - (b) Project from the door, a distance of no more than 1/2 inch nor less than 1/8 inch from the hoistway edge of the sill.
- (5) Only the following devices may be used to render inoperative hoistway door interlocks, the electric contacts of hoistway door combination mechanical locks and electric contacts, or car door or gate electric contacts:
 - (a) Leveling devices.
 - (b) Truck-zoning devices.
 - (c) Hoistway access switch.
 - (d) Existing devices which do not conform to the above must be removed.

WAC 296-96-23222 What control requirements apply to operating circuits?

The failure of any single magnetically operated switch, contractor, or relay to release in the intended manner, or the occurrence of a single accidental ground, must not permit the car to start or run if any hoistway door interlock is unlocked or if any hoistway door or car door or gate electric contact is not in the closed position.

WAC 296-96-23225 What requirements apply to car emergency exits?

- (1) Top emergency exits:
 - (a) Top emergency exit covers must be hinged or otherwise attached to the car top so that the cover can be opened from the top of the car only and opens outward.
 - (b) The exit cover of the lower compartment of a multideck elevator car must be openable from either compartment.
- (2) Side emergency exits:
 - (a) Side emergency exit doors or panels, where provided, must have a lock arranged so that the door may be opened from the inside of the car only by a special shaped removable key and outside the car by means of a non-removable handle.
 - (b) Side emergency car exit door panels must open only into the car.

WAC 296-96-23226 What requirements apply to car lighting?

- (1) Car interiors must be equipped with at least 2 electric lights.
- (2) Minimum illumination at the car threshold, with the door closed, must be at least:
 - (a) 5 foot candle (54lx) for passenger elevators; and
 - (b) 2 1/2 foot candle (27lx) for freight elevators.
- (3) The department does not require light control switches, however, if installed they must be

located in or adjacent to the car's onboard operating device.

(4) In automatic elevators, the light control switch must be either a key-operated type or located in a fixture with a locked cover.

(5) Light fixtures mounted on car tops must be equipped with a non-key operated switch located in or adjacent to the fixture.

Section 5

Safeties

WAC 296-96-23227 What requirements apply to car safeties?

Every elevator car suspended by wire ropes must be equipped with safeties. The safety device must be capable of stopping and sustaining the entire car with its rated load in the event of cable severance or overspeed. There must be a switch on the car activated by the setting of the safeties that will stop electric power from the driving machine motor and brake. Car safeties are identified and classified on the basis of performance characteristics after the safety begins to apply pressure on the guide rails.

(1) Type A safeties:

(a) Develop a rapidly increasing pressure on the guide rails during the stopping interval, the stopping distance being very short due to the inherent design of the safety.

(b) Operating force is derived entirely from the mass and the motion of the car or the counterweight being stopped.

(c) Apply pressure on the guide rails through eccentrics, rollers, or similar devices without any flexible medium purposely introduced to limit the retarding force and increase the stopping distance.

(2) Type B safeties:

(a) Apply limited pressure on the guide rails during the stopping interval and provide stopping distances that are related to the mass being stopped and the speed at which application of the safety is initiated.

(b) Retarding forces are reasonably uniform after the safety is fully applied.

(c) Continuous tension in the governor rope may or may not be required to operate the safety during the entire stopping interval.

(d) Minimum and maximum distances are specified on the basis of governor tripping speed.

(3) Type C safeties (Type A with oil buffers):

(a) Develop retarding forces during the compression stroke of one or more oil buffers interposed between the lower members of the car frame and a governor-operated Type A auxiliary safety plank applied on the guide rails.

(b) The stopping distance is equal to the effective stroke of the buffers.

(4) Type G safeties:

(a) Are similar to Type B except for having a gradually increasing retarding force.

(b) May be either of the wedge clamp type or the flexible guide clamp type applied by a cable which unwinds a drum below the car floor.

(5) Slack rope safeties:

(a) Are actuated by the slackening or breaking of the hoisting ropes.

(b) Are not actuated by an overspeed governor.

WAC 296-96-23228 What is the maximum amount of governor rope movement allowed when operating a safety mechanism?

For all Type B safeties, the movement of the governor rope relative to the car or the counterweight, respectively, required to operate the safety mechanism from its fully retracted position to a position where the safety jaws begin to exert pressure against the guide rails must not exceed the following values based on rated speed:

- (1) For car safeties:
 - (a) 200 feet per minute or less: 42 inches.
 - (b) 201 to 375 feet per minute: 36 inches.
 - (c) Over 375 feet per minute: 30 inches.
- (2) For counterweight safeties: 42 inches for all speeds.
- (3) Drum operated car and counterweight safeties requiring continual unwinding of the safety drum rope to fully apply the safety, must be designed so that no less than three turns of the safety rope will remain on the drum after the overspeed test of the safety has been made with rated load in the car.

WAC 296-96-23229 What requirements apply to rail lubricants and lubrication plates?

Rail lubricants or coating which will reduce the holding power of the safety or prevent its functioning as required must not be used.

- (1) A metal plate must be securely attached to the car crosshead in an easily visible location and, where lubricants are to be used, must carry the notation, "Consult manufacturer of the safety for the characteristics of the rail lubricant to be used." If lubricants are not to be used, it should be stated so on the plate.
- (2) If lubricants other than those recommended by the manufacturer are used, a safety test should be done to demonstrate that the safety will function as required.

Section 6
Speed Governors

WAC 296-96-23235 What requirements apply to speed governors?

A speed governor or inertia trip safety or a slack cable must be installed on all elevators and must be designed so that it will activate the car safeties before the car attains a speed of 140 percent of the rated speed. Governor ropes must be at least 3/8 inch in diameter, if iron or steel rope, and at least 3/4 inch, if manila rope. Tiller rope must not be used.

WAC 296-96-23236 What requirements apply to speed governor overspeed and car safety mechanism switches?

- (1) A switch must be provided on the speed governor and operated by the overspeed action of the governor when used with Type B and C car safeties of elevators having a rated speed exceeding 150 feet per minute.
- (2) A switch must be provided on the speed governor when used with a counterweight safety for any car speed.
- (3) For static control, an overspeed switch must be provided regardless of rated speed and it must operate in both directions of travel.
- (4) These switches must, when operated, remove power from the driving-machine motor and brake before or at the time of application of the safety.

(5) Switches used to perform the function specified must be positively opened and remain open until manually reset.

(6) Switches operated by the car safety mechanism must be of a type which will not reset unless the car safety mechanism has been returned to the "off" position.

Section 7 Capacity and Loading

WAC 296-96-23240 What is the minimum rated load for passenger elevators?

The rated load in pounds for passenger elevators must be based on the inside net platform areas and must be not less than shown in the table below. The inside net platform areas must be determined as shown in Table 3.7.1 which shows the maximum inside net platform areas for the various common rated loads. If other rated loads are used, they must be at least the following:

(1) For an elevator with an inside net platform area of no more than 50 feet squared, $W = 0.667A$ squared $+ 66.7A$.

(2) For an elevator with an inside net platform area of more than 50 feet squared, $W = 0.0467A$ squared $+ 125A - 1367$.

NOTE: A := inside net platform area, ft. squared
 W := minimum rated load, lb.

MAXIMUM.* INSIDE NET PLATFORM AREAS FOR THE VARIOUS RATED LOADS			
Rated Load, lb.	Inside Net Platform Area, ft ²	Rated Load, lb.	Inside Net Platform Area, ft ²
500	7.0	5,000	50.0
600	8.3	6,000	57.7
700	9.6	7,000	65.3
1,000	13.25	8,000	72.9
1,200	15.6	9,000	80.5
1,500	18.9	10,000	88.0
1,800	22.1	12,000	103.0
2,000	24.2	15,000	125.1
2,500	29.1	18,000	146.9
3,000	33.7	20,000	161.2
3,500	38.0	25,000	196.5
4,000	42.2	30,000	231.0
4,500	46.2		
.*To allow for variations in cab designs, an increase in the maximum inside net platform area not exceeding 5% will be permitted for the various rated loads.			

WAC 296-96-23241 What requirements apply to the use of partitions that reduce inside net platform area?

When partitions are used in elevator cars to restrict net platform area for passenger use, they must be permanently fastened in place.

- (1) Gates, doors, or handrails must not be used as partitions.
- (2) Partitions must be installed to permit approximately symmetrical loading.
- (3) When conditions do not permit symmetrical loading, guide rails, car frames, and platforms must be capable of sustaining the resulting stresses and deflections.

WAC 296-96-23243 What is the minimum rated load for freight elevators?

The minimum rated load for freight elevators in pounds must be based on the weight and class of the load to be handled but must in no case be less than the minimum specified in this section for each class of loading based on the inside net platform area. Freight elevators must be designed for one of the following classes of loading:

- (1) Class A--General freight loading: Where the load is distributed, the weight of any single piece of freight or of any single hand truck and its load is not more than one-quarter the rated load of the elevator, and the load is handled on and off the car platform manually or by means of hand trucks. For this class of loading, the rated load must be based on not less than 50 lb./ft. squared of inside net platform area.
- (2) Class B--Motor vehicle loading: Where the elevator is used solely to carry automobile trucks or passenger automobiles up to the rated load of the elevator. For this class of loading, the rated load must be based on not less than 30 lb./ft. squared of inside net platform area.
- (3) Class C--Industrial truck loading: Where the load is carried in transit or is handled on and off the car platform by means of power industrial trucks or by hand trucks having a loaded weight more than one-quarter the rated load of the elevator. For this class of loading the following requirements apply:
 - (a) The rated load must be based on not less than 50 lb./ft. squared of inside net platform area;
 - (b) The weight of the loaded industrial truck must not exceed the rated load of the elevator;
 - (c) The weight of the loaded industrial truck plus any other material carried on the elevator must not exceed the rated load when the industrial truck is also carried;
 - (d) During loading and unloading, the load on the elevator must in no case exceed 150 percent of the rated load, and where this load exceeds the rated load, the capacity of the brake and the traction relation must be adequate to safely sustain and level at least 150 percent of the rated load.

NOTE: When the entire rated load is placed on the elevator by the industrial truck in increments, the load imposed on the car platform while the last increment is being loaded or the first increment unloaded will exceed the rated load by the weight of the empty industrial truck.

WAC 296-96-23244 What requirements apply to capacity plates?

- (1) Every elevator must be equipped with a capacity plate or a painted sign that is permanently and securely fastened in place and located in a conspicuous position inside the car. It must indicate the rated load of the elevator in pounds, and for freight elevators, this plate or sign must indicate:
 - (a) The capacity for lifting one-piece loads;
 - (b) For freight elevators used for industrial truck loading where the truck is not usually carried by

the elevator but used only for loading and unloading, the maximum load the elevator is designed to support while being loaded or unloaded.

(2) Capacity plates must be durable and readily legible. The height of the letters and figures must be at least 1/4 inch for passenger elevators and 1 inch for freight elevators.

WAC 296-96-23245 What requirements apply to signs on freight elevators?

In addition to the capacity plate or painted sign required by WAC 296-96-23244, two other signs must be installed or painted inside the car in a conspicuous place and permanently and securely fastened to the car enclosure. They must be durable and easily read with 1/2 inch letters, as follows:

(1) In elevators not permitted to carry passengers, the sign must read "This is not a passenger elevator; no persons other than the operator and freight handlers are permitted to ride on this elevator."

(2) In elevators permitted to carry employees, the sign must read "No passengers except employees permitted".

Section 8

Driving Machines and Sheaves

WAC 296-96-23250 What general requirements apply to driving machines and sheaves?

(1) Sheaves and drums must be made of cast iron or steel and must have finished grooves for ropes.

(2) Set screws fastenings must not be used in lieu of keys or pins on connections subject to torque or tension.

(3) Friction gearing or a clutch mechanism must not be used to connect a driving-machine drum or sheave to the main driving mechanism, other than in connection with a car leveling device.

WAC 296-96-23255 What requirements apply to winding drum machines?

(1) Winding drum machines must be equipped with a slack-rope device with an enclosed switch of the manually reset type which must cause the electric power to be removed from the elevator driving machine motor and brake if the hoisting ropes become slack or broken.

(2) Winding drum machines must be equipped with adjustable machine automatic terminal stop mechanisms set to directly open the main line circuit to the driving machine motor and brake coincident with the opening of the final terminal stopping switch. Chain, belt, or rope-driven mechanisms must not be used.

WAC 296-96-23256 What requirements apply to indirect-drive machines?

(1) Indirect-drive machines, utilizing V belts, tooth drive belts, or chain drives, must have at least three belts or chains operating together in parallel as a set. Belt and chain drive sets must be pre-loaded and matched for length.

(2) Belt set selection must be based upon the manufacturer's rated breaking strength and a safety factor of 10. Chain and sprocket set selection must be based upon the recommendations in the supplementary information section of ASME/ANSI B 29.1, using a service factor of 2.0. Offset links in a chain are permitted. Chain drives and belt drives must be guarded to protect against accidental contact and to prevent foreign objects from interfering with drives.

Sprockets in a chain drive set and also in a driven set must be assembled into a common hub, with teeth cut in line after assembly to assure equal load distribution on all chains. Tooth sheaves for a belt drive must be constructed in a manner to assure equal load distribution on each belt in the set.

Load determination for both the belt and chain sets must be based on the maximum static loading on the elevator car (full load on the car and the car at rest at a position in the hoistway which creates the greatest load, including either the car or counterweight resting on its buffer).

(3) Each belt or chain in a set must be continuously monitored by a broken belt or chain device of the manually reset type which must function to automatically interrupt power to the machine and apply the brake in the event any belt or chain in the set breaks or becomes excessively slack. The driving machine brake must be located on the traction sheave or winding drum assembly side of the driving machine so as to be fully effective in the event the entire belt set or chain set should break.

(4) If one belt or chain of a set is worn, stretched, or damaged so as to require replacement, the entire set must be replaced. Sprockets and toothed sheaves must also be inspected on such occasion and be replaced if noticeably worn.

WAC 296-96-23260 What requirements apply to driving machine brakes?

The elevator driving machine must be equipped with a friction brake applied by a spring or springs, and released electrically.

The brake must be designed to have a capacity sufficient to hold the car at rest with its rated load. For passenger elevators and freight elevators permitted to carry employees, the brake must be designed to hold the car at rest with an additional load up to 25 percent in excess of the rated load.

WAC 296-96-23261 What requirements apply to the application and release of driving machine brakes?

Driving machine brakes must not be electrically released until power has been applied to the driving machine motor. All power feed lines to the brake must be opened and the brake must apply automatically when:

- (1) The operating device of a car switch or continuous pressure operation elevator is in the stop position;
- (2) A floor stop device functions;
- (3) Any of the electrical protective devices in WAC 296-96-23272 functions;

Under conditions described in subsection (1) and (2) of this section, the application of the brake may occur on or before the completion of the slowdown and leveling operations.

The brake must not be permanently connected across the armature or field of a direct current elevator driving machine motor.

Section 9

Terminal Stopping Devices

WAC 296-96-23262 What requirements apply to normal terminal stopping devices?

Enclosed upper and lower normal terminal stopping devices must be provided and arranged to slow down and stop the car automatically, at or near the top and bottom terminal landings. These devices must function independently of the operation of the normal stopping means and of the final terminal stopping device.

- (1) Normal stopping devices must be located on the car, in the hoistway, or in the machine room and must be operated by the movement of the car.
- (2) Broken rope, tape, or chain switches must be provided in connection with normal terminal stopping devices located in the machine room of traction elevators. These switches must be opened by a failure of the rope, tape, or chain and must cause the electrical power to be removed from the driving machine motor and brake.

WAC 296-96-23264 What requirements apply to final terminal-stopping devices?

Enclosed upper and lower final terminal electro-mechanical stopping devices must be provided and arranged to prevent movement of the car by the normal operating devices in either direction of travel after the car has passed a terminal landing. Final terminal stopping devices must be located as follows:

- (1) Elevators with winding drum machines must have stopping switches on the machines and also in the hoistway operated by the movement of the car.
- (2) Elevators with traction driving machines must have stopping switches in the hoistway operated by the movement of the car.

Section 10

Operating Devices and Control Equipment

WAC 296-96-23266 What types of operating devices must not be used? The following types of operating devices must not be used:

- (1) Rope (i.e., shipper rope);
- (2) Rod operating devices activated directly by hand; or
- (3) Rope operating devices activated by wheels, levers, or cranks.

WAC 296-96-23268 What requirements apply to car-switch operation elevators?

The handles of lever-type operating devices of car-switch operation elevators must be arranged so that they will return to the stop position and latch there automatically when the hand of the operator is removed.

WAC 296-96-23269 What requirements apply to passenger elevator emergency stop buttons?

Passenger elevator emergency stop buttons or switches must be installed and connected so as to activate the elevator alarm when in the stop position. An optional door hold open switch may be provided, if desired, but such door hold open function must automatically cancel upon activation of a Phase I recall.

WAC 296-96-23270 What requirements apply to car top operating devices?

- (1) Elevators with automatic or continuous-pressure operation must have a continuous-pressure button operating switch mounted on the car top for the purpose of operating the car solely from the top of the car. The device must operate the car at a speed not exceeding 150 feet per minute.
- (2) The means for transferring the control of the elevator to the top-of-car operating device must be on the car top and located between the car crosshead and the side of the car nearest the hoistway entrance normally used for access to the car top.

WAC 296-96-23272 What electrical protective devices are required?

Electrical protective devices must be installed according to the following:

- (1) Slack-rope switch: Winding drum machines must be accompanied by a slack-rope device equipped with a slack-rope switch of the enclosed manually reset type which will cause the electric power to be removed from the elevator driving machine motor and brake if the suspension ropes become slack.
- (2) Motor-generator running switch: Where generator-field control is used, means must be provided to prevent the application of power to the elevator driving machine motor and brake unless the motor generator set connections are properly switched for the running condition of the elevator. It is not required that the electrical connections between the elevator driving machine motor and the generator be opened in order to remove power from the elevator motor.
- (3) Compensating rope sheave switch: Compensating rope sheaves must be provided with a compensating rope sheave switch or switches mechanically opened by the compensating rope sheave before it reaches its upper or lower limit of travel to cause the electric power to be removed from the elevator driving machine motor and brake.
- (4) Broken rope, tape, or chain switches used in connection with machine room normal terminal stopping switches: Broken rope, tape, or chain switches which meet the requirements of WAC 296-96-23236 must be provided in connection with normal terminal stopping devices located in machine rooms of traction elevators. These switches must open when a rope, tape, or chain fails.
- (5) Stop switch on top of car: A stop switch must be provided on the top of every elevator car, which must cause the electric power to be removed from the elevator driving machine motor and brake, and must:
 - (a) Be of the manually operated and closed type;
 - (b) Have red operating handles or buttons;
 - (c) Be conspicuously and permanently marked "STOP" and indicated the stop and run positions;
 - (d) Be positively opened mechanically (opening must not be solely dependent on springs).
 - (e) Have red operating handles or buttons;
 - (f) Be conspicuously and permanently marked "stop";
 - (g) Indicate the "stop" and "run" positions; and
 - (h) Be positively opened mechanically and not solely dependent on springs.
- (6) Car-safety mechanism switch: A switch is required where a car safety is provided.
- (7) Speed governor overspeed switch: A speed governor overspeed switch must be provided when required by WAC 296-96-23236.
- (8) Final terminal stopping devices: Final terminal stopping devices must be provided on every elevator.
- (9) Emergency terminal speed limiting device: Where reduced stroke oil buffers are provided, emergency terminal speed limiting devices are required.

(10) Motor generator overspeed protection: Means must be provided to cause the electric power to be removed automatically from the elevator driving machine motor and brake should a motor generator set, driven by a direct current motor, overspeed excessively.

(11) Motor field sensing means: Where direct current is supplied to an armature and shunt field of an elevator driving machine motor, a motor field current sensing means must be provided, which must cause the electric power to be removed from the motor armature and brake unless current is flowing in the shunt field of the motor.

A motor field current sensing means is not required for static control elevators provided with a device to detect an overspeed condition prior to, and independent of, the operation of the governor overspeed switch. This device must cause power to be removed from the elevator driving machine motor armature and machine brake.

(12) Buffer switches for oil buffers used with Type C car safeties: Oil level and compression switches must be provided for all oil buffers used with Type C safeties.

(13) Hoistway door interlocks or hoistway door electric contacts: Hoistway door interlocks or hoistway door electric contacts must be provided for all elevators.

(14) Car door/gate electric contacts: Car door or gate electric contacts must be provided on all elevators.

(15) Normal terminal stopping devices: Normal terminal stopping devices must be provided on every elevator.

(16) Car side emergency exit electric contact: An electric contact must be provided on every car side emergency exit door.

(17) Electric contacts for hinged car platform sills: Hinged car platform sills, where provided, must be equipped with electric contacts.

(18) Stop switch in the elevator pit: A stop switch must be installed in all elevator pits. It must be located between 36 inches to 48 inches above the bottom landing floor and accessible from outside the hoistway.

WAC 296-96-23274 What requirements apply to the power supply line disconnect?

(1) A disconnect switch or a circuit breaker must be installed and connected into the power supply line to each elevator motor or motor generator set and controller. The power supply line must be equipped with overcurrent protection inside the machine room.

(2) The disconnect switch or circuit breaker must be of the manually closed multipole type and be visible from the elevator driving machine or motor generator set. When the disconnecting means is not within sight of the driving machine, the control panel, or the motor generator set, an additional manually operated switch must be installed adjacent to the remote equipment and connected in the control circuit to prevent starting.

(3) No provision may be made to close the disconnect switch from any other part of the building.

(4) Where there is more than one driving machine in a machine room, disconnect switches or circuit breakers must be numbered to correspond to the number of the driving machine which they control.

WAC 296-96-23276 What requirements apply to phase reversal and failure protection methods? Elevators having polyphase alternating current power supply must be equipped with a means to prevent the starting of the elevator motor if the phase rotation is in the wrong direction or if there is a failure of any phase.

This protection may be considered to be provided in the case of generator field control having alternating current motor-generator driving motors, provided a reversal of phase will not cause the elevator driving machine motor to operate in the wrong direction. Controllers on which switches are operated by polyphase torque motors provide inherent protection against phase reversal or failure.

WAC 296-96-23277 What requirements apply to grounding and overcurrent protections?

(1) Control and operating circuit requirements must comply with Article 620-61 of the National Electrical Code.

(2) Grounding methods must comply with Articles 620-81 through 620-85 of the National Electrical Code.

WAC 296-96-23278 What requirements apply to the absorption of regenerated power?

When a power source is used which, in itself, is incapable of absorbing the energy generated by an overhauling load, means for absorbing sufficient energy to prevent the elevator from attaining governor tripping speed or a speed in excess of 125 percent of rated speed, whichever is lesser, must be provided on the load side of each elevator power supply line disconnecting means.

WAC 296-96-23279 What requirements apply to door by-pass systems?

Door by-pass systems, where used, must conform to the requirements of ASME A17.1, Rule 210.1e.

Section 11

Emergency Operation and Signaling Devices

WAC 296-96-23280 What requirements apply to all car emergency signaling devices in all buildings?

All elevators must be equipped with an audible signaling device that can be activated by a switch or button marked "alarm". This switch or button must be located in or adjacent to each car's operating panel.

The signaling device must be located inside the building and audible inside the car and outside the hoistway. One signaling device may be used for a group of elevators.

Section 12

Suspension Systems and Their Connections

WAC 296-96-23282 What requirements apply to suspension systems?

Cars must be suspended by steel wire ropes attached to the car frame or passing around sheaves attached to the car frame. Only iron (low carbon steel) or steel wire ropes, having the commercial classification "elevator wire rope," or wire rope specifically constructed for elevator use may be used for the suspension of elevator cars and for the suspension of counterweights. The wire material for ropes must be manufactured by the open-hearth or electric furnace process or its equivalent.

WAC 296-96-23283 What requirements apply to rope data tags?

At each rope renewal, a new metal data tag must be securely attached to one of the wire rope fastenings. Rope data tags must be durable and readily legible. The height of letters and figures must be no less than 1/16 inch. This data tag must bear the following information:

- (1) The diameter in inches;
- (2) The manufacturer's rated breaking strength;
- (3) The grade of material used;
- (4) The month and year the ropes were installed;
- (5) Whether nonpreformed or preformed;
- (6) Construction classification
- (7) Name of the person or firm who installed the ropes;
- (8) Name of the manufacturer of the rope;
- (9) The number of ropes; and
- (10) The date on which the rope was resocketed or other types of fastening changed.

WAC 296-96-23284 What is the factor of safety for wire suspension ropes?

The factor of safety for wire suspension ropes must at least be equivalent to the values shown in the following table. The factor of safety must be based on the actual rope speed corresponding to the car's rated speed. The factor of safety must be calculated by the following formula:

$$f = S \text{ times } N \text{ over } W$$

where

N .= number of runs of rope under load. (For 2:1 roping, twice the number of ropes used. For 3:1 roping, three times, etc.)

S .= manufacturer's rated breaking strength of one rope.

W .= maximum static load imposed on all car ropes with the car and its rated load at any position in the hoistway.

Table 3.7.1					
MAXIMUM FACTORS OF SAFETY FOR SUSPENSION WIRE ROPES					
Rope Speed, fpm	Minimum Factor of Safety		Rope Speed, fpm	Minimum Factor of Safety	
	Passenger	Freight		Passenger	Freight
50	7.60	6.65	605	10.85	9.65
75	7.75	6.85	700	11.00	9.80
100	7.95	7.00	750	11.15	9.90
125	8.10	7.15	800	11.25	10.00
150	8.25	7.30	850	11.35	10.10
175	8.40	7.45	900	11.45	10.15
200	8.60	7.65	950	11.50	10.20
225	8.75	7.75	1000	11.55	10.30
250	8.90	7.90	1050	11.65	10.35
300	9.20	8.20	1100	11.70	10.40
350	9.50	8.45	1150	11.75	10.45
400	9.75	8.70	1200	11.80	10.50
450	10.00	8.90	1250	11.80	10.50
500	10.25	9.15	1300	11.85	10.55
550	10.45	9.30	1350	11.85	10.55
600	10.70	9.50	1400-2000	11.90	10.55

WAC 296-96-23285 What is the minimum number of suspension ropes allowed?

All elevators, except freight elevators that do not carry passengers or freight handlers and have no means of operation in the car, must conform to the following requirements:

- (1) The minimum number of hoisting ropes used is three for traction elevators and two for drum-type elevators. Where a car counterweight is used, the number of counterweight ropes used must not be less than two.
- (2) The minimum diameter of hoisting and counterweight ropes is 3/8 inch. Outer wires of the ropes must be no less than 0.024 inch in diameter. The term "diameter" where used in this section refers to the nominal diameter as given by the rope manufacturer.

WAC 296-96-23287 What requirements apply to suspension rope equalizers?

Suspension rope equalizers, where provided, must be of the individual-compression spring type. Equalizers of other type may be used with traction elevators provided the equalizers and fastenings are approved by the authority having jurisdiction on the basis of adequate tensile and

fatigue tests made by a qualified laboratory. Such tests must show the ultimate strength of the equalizer and its fastenings in its several parts and assembly, which must be no less than 10 percent in excess of the strength of suspension ropes, provided that equalizers of the single-bar type, or springs in tension, must not be used to attach suspension ropes to cars or counterweights or to dead-end hitch plates.

WAC 296-96-23288 What requirements apply to securing suspension wire ropes to winding drums?

Suspension wire ropes on winding drum machines must have the drum ends of the ropes secured on the inside of the drum by clamps, tapered babbitted sockets, or other means approved by the department.

WAC 296-96-23289 What requirements apply to spare rope turns on winding drum machines?

Suspension wire ropes of winding drum machines must have the drum ends of the ropes secured on the inside of the drum by clamps or by tapered babbitted sockets, or by other means approved by the department.

WAC 296-96-23290 What requirements apply to suspension rope fastenings? Spliced eyes by return loop may continue in service. Suspension rope fastenings must conform to the requirements of ASME A17.1 Rule 212.9 when the ropes are replaced.

WAC 296-96-23291 What requirements apply to auxiliary rope fastening devices? Auxiliary rope fastening devices, designed to support cars or counterweights if any regular rope fastenings fail, may be provided subject to approval by the authority having jurisdiction.

Subpart III
Hydraulic Elevators

WAC 296-96-23300 What is the scope of Subpart III, Hydraulic Elevators?

Subpart III, Hydraulic Elevator, is the minimum standard for existing direct plunger and roped hydraulic elevators.

Section 1
Hoistways, Hoistway Enclosures,
and Related Construction

WAC 296-96-23302 What requirements apply to hoistways, hoistway enclosures and related construction?

All hoistways, hoistway enclosures and related construction must conform to the requirements of Subpart I, Hoistways and Related Construction for Electric and Hydraulic Elevators.

Section 2

Mechanical Equipment

WAC 296-96-23304 What requirements apply to buffers and bumpers? Car buffers or bumpers must be provided. Solid bumpers may be used in lieu of buffers where the rated speed is 50 feet per minute or less.

WAC 296-96-23307 What requirements apply to car frames and platforms? All car frames and platforms must conform to the requirements of WAC 296-96-23206.

WAC 296-96-23309 What requirements apply to car enclosures? Car enclosures must conform to the requirements of WAC 296-96-23215.

WAC 296-96-23311 What requirements apply to capacity and loading? Capacity and loading must conform to the requirements of WAC 296-96-23240.

Section 3

Driving Machines

WAC 296-96-23313 What requirements apply to driving machine connections?

The driving member of a direct plunger driving machine must be attached to the car frame or car platform with fastenings of sufficient strength to support that member.

The connection to the driving machine must be capable of withstanding, without damage, any forces resulting from a plunger stop.

WAC 296-96-23316 What requirements apply to plunger stops?

Plungers must be provided with solid metal stops and/or other means to prevent the plunger from traveling beyond the limits of the cylinder. Stops must be designed and constructed so as to stop the plunger from maximum speed in the up direction under full pressure without damage to the connection to the driving machine, plunger, plunger connection, or any other parts of the hydraulic system. For rated speeds exceeding 100 feet per minute where a solid metal stop is provided, means other than the normal terminal stopping device (i.e., emergency terminal speed limiting device) must be provided to retard the car to 100 feet per minute with a retardation no greater than gravity, before striking the stop.

Section 4

Valves, Supply Piping, and Fittings

WAC 296-96-23318 What requirements apply to pump relief valves?

(1) Each pump or group of pumps must be equipped with a relief valve conforming to the following specifications, except as covered by subsection (2) of this section:

(a) The relief valve must be located between the pump and the check valve and must be of such a type and installed in the by-pass connection so that the valve cannot be shut off from the hydraulic system.

- (b) The relief valve must be preset to open at a pressure no greater than 125 percent of working pressure.
- (c) The size of the relief valve and by-pass must be sufficient to pass the maximum rated capacity of the pump without raising the pressure more than 20 percent above that at which the valve opens. Two or more relief valves may be used to obtain the required capacity.
- (d) Relief valves having exposed pressure adjustments, if used, must have their means of adjustment sealed after being set to the correct pressure.
- (2) No relief valve is required for centrifugal pumps driven by induction motors, provided the shutoff, or maximum pressure which the pump can develop, is not greater than 135 percent of the working pressure at the pump.

WAC 296-96-23321 What requirements apply to check valves?

A check valve must be provided and must be installed so that it will hold the elevator car with rated load at any point when the pump stops or the maintained pressure drops below the minimum operating pressure.

WAC 296-96-23322 What requirements apply to supply piping and fittings?

Supply piping and fittings must be in sound condition and secured in place.

WAC 296-96-23323 What requirements apply to flexible hydraulic connections?

When flexible hydraulic connections are replaced, the requirements of ANSI A17.1, Rule 303.1d must be met in all respects. Where flexible connections pass through walls, the replacement must be made with steel piping.

Section 5

Tanks

WAC 296-96-23324 What general requirements apply to tanks?

- (1) All tanks must have sufficient capacity to provide for an adequate liquid reserve to prevent the entrance of air or other gas into the system.
- (2) The permissible minimum liquid level must be clearly indicated.

WAC 296-96-23325 What requirements apply to pressure tanks?

- (1) Tanks which may be subjected to vacuum sufficient to cause collapse must be provided with one or more vacuum relief valves with openings of sufficient size to prevent collapse of the tank.
- (2) Tanks must be provided with one or more gauge glasses attached directly to the tank and equipped to shut off the liquid automatically in case of failure of the glass. The gauge glass or glasses must be located so as to indicate any level of the liquid between permissible minimum and maximum levels and be equipped with a manual cock at the bottom of the lowest glass.
- (3) Tanks must be provided with a pressure gauge which will indicate the pressure correctly to no less than 1 1/2 times the pressure setting of the relief valve. The gauge must be connected to the tank or water column by pipe and fittings with a stop cock in such a manner that it cannot be shut off from the tank except by a stop cock. The stop cock must have a "T" or level handle set in line with the direction of flow through the valve when open.
- (4) Tanks must have a 1/4 inch pipe size valve connection for attaching an inspector's pressure gauge when the tank is in service.

- (5) Tanks must be equipped with means to render the elevator inoperative if for any reason the liquid level in the tank falls below the permissible minimum.
- (6) Tanks must be equipped with means for internal inspection.
- (7) Piping and fittings for gauge glasses, relief valves, and pressure gauges must be of a material that will not be corroded by the liquid used in the tank.

Section 6

Terminal Stopping Devices

WAC 296-96-23326 What requirements apply to terminal stopping devices?

Terminal stopping devices must conform to the requirements of WAC 296-96-23262.

Section 7

Operating Devices and Control Equipment

WAC 296-96-23328 What requirements apply to operating devices?

Operating devices must conform to the requirements of WAC 296-96-23266 and WAC 296-96-23268.

WAC 296-96-23330 What requirements apply to car top operating devices?

Top-of-car operating devices must be provided and must conform to the requirements of WAC 296-96-23270, except for uncounterweighted elevators having a rise of no more than 15 feet.

The bottom normal terminal stopping device may be made ineffective while the elevator is under the control of the top-of-car operating device.

WAC 296-96-23332 What requirements apply to anti-creep leveling devices? Each elevator must be provided with an anticreep leveling device conforming to the following specifications:

- (1) It must maintain the car within 3 inches of the landing regardless of the position of the hoistway door.
- (2) For electrohydraulic elevators, it must operate the car only in the up direction.
- (3) For maintained pressure hydraulic elevators, it must operate the car in both directions.
- (4) Its operation may depend on the availability of the electric power supply provided that:
 - (a) The power supply line disconnecting means required by WAC 296-96-23274 is kept in the closed position at all times except during maintenance, repairs, and inspections;
 - (b) The electrical protective devices required by WAC 296-96-23334 must not cause the power to be removed from the device.

WAC 296-96-23334 What requirements apply to electrical protective devices?

Electrical protective devices, if provided, must conform with the requirements of WAC 296-96-23272 and operate as follows:

- (1) The following devices must prevent operation of the elevator by the normal operating device and also the movement of the car in response to the anticreep leveling device:
 - (a) Stop switches in the pit;
 - (b) Stop switches on top of the car; and
 - (c) Car side emergency exit door electric contacts, where such doors are provided.

(2) The following devices must prevent the operation of the elevator by the normal operating device but the anticreep leveling device required by WAC 296-96-23332 must remain operative:

- (a) Emergency stop switches in the car;
- (b) Broken rope, tape, or chain switches on normal terminal stopping devices when such devices are located in the machine room or overhead space;
- (c) Hoistway door interlocks or hoistway door electric contacts;
- (d) Car door or gate electric contacts; and
- (e) Hinged car platform sill electric contacts.

WAC 296-96-23336 What requirements apply to power supply line disconnects? Power supply line disconnects must conform to the requirements of WAC 296-96-23274.

WAC 296-96-23338 What requirements apply to devices that make hoistway door interlocks or electric contacts and car door (gate) electric contacts inoperative?

The installation of these contacts must conform to the requirements of WAC 296-96-23221.

WAC 296-96-23340 What requirements apply to control and operating circuits?

Control and operating circuits must conform to the requirements of WAC 296-96-23222.

WAC 296-96-23342 What requirements apply to emergency operation and signaling devices?

Emergency operation and signaling devices must conform to the requirements of WAC 296-96-23280.

Section 8

Additional Requirements for Counterweighted Hydraulic Elevators

WAC 296-96-23344 What additional requirements apply to counterweighted hydraulic elevators?

Counterweighted hydraulic elevators must be roped so that the counterweight must not strike the overhead when the car is resting on its fully compressed buffer. Counterweighted hydraulic elevators must conform to the requirements of WAC 296-96-23205, where applicable.

Where counterweights are provided, counterweight buffers must be provided.

Subpart IV Escalators

WAC 296-96-23400 What is the scope of Subpart IV, Escalators?

Subpart IV, Escalators, is the minimum standard for existing escalators that are used to transport passengers.

Section 1

Construction

WAC 296-96-23405 What requirements apply to balustrades?

The balustrade must be totally closed except where the handrail enters the newel base. Gaps between interior panels are permitted provided that they are no wider than 3/16 inch and the edges are rounded or beveled.

WAC 296-96-23408 How much clearance is required between skirt panels and step treads?

The clearance on each side of the steps between the step tread and the adjacent skirt panel must be no more than 3/16 inch.

WAC 296-96-23410 What requirements apply to guards at ceiling or soffit intersections?

(1) A solid guard must be provided in the intersection of the angle of the outside balustrade (deck board) and the ceiling or soffit, except as indicated in subsection (2) of this section. The vertical edge of the guard must be a minimum of 8 inches. The escalator side of the vertical face of the guard must be flush with the face of the wellway. The exposed edge of the guard must be rounded and have a minimum width of 1/4 inch.

(2) Guards are not required under the following conditions:

(a) On high decks where the clearance of the outside edge of the deck and the ceiling or soffit is more than 12 inches or where the projected intersection of the outside deck and the ceiling or soffit is more than 24 inches from the centerline of the handrail;

(b) On low decks where the centerline of the handrail is more than 14 inches from the ceiling or soffit.

WAC 296-96-23412 What requirements apply to anti-slide devices?

On high deck balustrades, anti-slide devices must be provided on decks or combination of decks when the outer edge of the deck is greater than 12 inches from the centerline of the handrail or on adjacent escalators when the distance between the centerline of the handrails is greater than 16 inches.

These devices must consist of raised objects fastened to the decks, not closer than 4 inches to the handrail and spaced not greater than 6 feet apart. The height must be no less than 3/4 inch. There must be no sharp corners or edges.

WAC 296-96-23414 What requirements apply to handrails?

Each escalator must be equipped with a handrail that moves in the same direction and at substantially the same speed as the steps.

WAC 296-96-23416 What requirements apply to handrail guards?

Hand or finger guards must be provided at the point where the handrail enters the balustrade.

WAC 296-96-23418 What requirements apply to step riser slotting?

Escalators with smooth curved surface risers must have either:

(1) Steps having cleated risers provided with vertical cleats which mesh with slots on the adjacent step tread as the steps make the transition from the incline to the horizontal; or

(2) Means to cause the opening of the power circuits to the escalator driving machine motor and brake should a step be displaced against the upthrust track at the upper and lower curves in the passenger carrying line of the track system.

WAC 296-96-23420 What requirements apply to step tread slotting?

The tread surface of each step must be slotted in a direction parallel to the travel of the steps.

WAC 296-96-23422 What requirements apply to combplates?

There must be a combplate at the entrance and at the exit of every escalator. The combplate teeth must be meshed with and set into the slots in the tread surface so that the points of the teeth are always below the upper surface of the treads.

Section 2
Brakes

WAC 296-96-23424 What general requirements apply to escalator brakes?

Escalators must be equipped with a brake capable of stopping the up or down traveling escalator with any load up to the brake rated load. The brake must be mechanically or magnetically applied. If the brake is magnetically applied, a ceramic permanent magnet must be used.

WAC 296-96-23427 What requirements apply to main drive shaft brakes?

If the escalator brake is separated from the main drive shaft by a chain used to connect the driving machine to the main drive shaft, a mechanically or magnetically applied brake capable of stopping a down running escalator with brake rated load must be provided on the main drive shaft. If the brake is magnetically applied, a ceramic permanent magnet must be used.

Section 3
Operating and Safety Devices

WAC 296-96-23429 What requirements apply to starting switches?

Starting switches must be of the key-operated type and must be located so that the escalator steps are within sight.

WAC 296-96-23431 What requirements apply to emergency stop buttons?

There must be a red stop button in an accessible location at the top and bottom landings of each escalator. The operation of either one of these buttons must cause the interruption of power to the escalator. It must be impossible to start an escalator by means of these buttons. These buttons must be marked "escalator stop button."

WAC 296-96-23432 What requirements apply to speed governors?

(1) A speed governor must be provided, except as specified in subsection (2) of this section. Its operation must cause the interruption of power to the driving machine if the speed of the steps exceeds a predetermined value, which must be no more than 40 percent above the rated speed.

(2) The speed governor is not required where an alternating current squirrel cage induction motor is used and the motor is directly connected to the driving machine. (*NOTE:* The governor may be omitted in such case even though a chain is used to connect the sprocket on the driving machine to the sprocket on the main drive shaft.)

WAC 296-96-23434 What requirements apply to broken step-chain devices?

A broken step-chain device must be provided to cause the interruption of power to the driving machine if a step chain breaks, and, where no automatic chain tension is provided, if excessive sag occurs in either step chain.

WAC 296-96-23436 What requirements apply to brake applications?

The brake must automatically stop the escalator when any of the safety devices function.

WAC 296-96-23438 What requirements apply to broken drive-chain devices?

When the driving machine is connected to the main drive shaft by a chain, a device must be provided which will cause the application of the brake on the main drive shaft and also stop the drive machine if the drive chain parts.

WAC 296-96-23440 What requirements apply to skirt obstruction devices?

Means must be provided to stop the escalator if an object becomes accidentally caught between the step and the skirt as the step approaches the upper or lower combplate. The device shall be located so that the escalator will stop before that object reaches the combplate.

WAC 296-96-23442 What requirements apply to rolling shutter devices?

Rolling shutters, if used, must be equipped with a device which will be activated as the shutters begin to close to cause the opening of the power circuit to the escalator driving machine motor and brake.

WAC 296-96-23444 What requirements apply to reversal stop device?

Means must be provided to cause the opening of the power circuit to the driving machine motor and brake in case of accidental reversal of travel while the escalator is operating in the ascending direction.

WAC 296-96-23446 What requirements apply to tandem operations?

Tandem operation escalators must be electrically interlocked where traffic flow is such that bunching will occur if the escalator is carrying passengers away from the intermediate landing stops.

The electrical interlocks must stop the escalator carrying passengers into the common intermediate landing if the escalator carrying passengers away from the landing stops. These escalators must also be electrically interlocked to assure that they run in the same direction.

WAC 296-96-23448 What requirements apply to caution signs?

A caution sign must be located at the top and bottom landings of each escalator, readily visible to the boarding passengers. The sign must be of the standard design recognized by the elevator industry and include the following:

- (1) Caution;
- (2) Passenger only;
- (3) Hold handrail;
- (4) Attend children; and
- (5) Avoid sides.

Section 4
Lighting of Step Treads

WAC 296-96-23450 What requirements apply to step tread lighting?

Step treads must be illuminated throughout their run. The light intensity on the treads must be in accordance with local codes and ordinances for stairways.

It is recommended that the illumination be of uniform intensity and that it not contrast significantly with that of the surrounding area.

Subpart V
Dumbwaiters and Hand-powered Elevators

WAC 296-96-23500 What is the scope of Subpart V, Dumbwaiters and hand-powered elevators? Subpart V, Dumbwaiters and Hand-powered Elevators, is a minimum standard for existing electric and hand-powered dumbwaiters and hand-powered elevators.

WAC 296-96-23510 What requirements apply to electric and electro-hydraulic dumbwaiters?

- (1) Dumbwaiter cars may be constructed of metal or wood and must be in compliance with local ordinances as to fire resistance providing it is constructed to carry its rated load without distortion. The dumbwaiter car must be fully enclosed except for the landing sides. The car floor must not exceed 9 square feet in area and the total inside height must not exceed 4 feet and the maximum capacity must not exceed 500 pounds.
- (2) Electrically-operated machines must be equipped with brakes that are electrically released and applied automatically by springs in conformity with the requirements set forth in WAC 296-96-23260.
- (3) Dumbwaiters equipped with winding drum machines having a travel of more than 30 feet and a rated load of more than 100 pounds, must be equipped with a slack rope switch which will automatically remove the power from the motor and brake when the hoisting ropes become slack.

WAC 296-96-23540 What requirements apply to hand-power elevators and dumbwaiters?

(1) Cars of hand-power elevators and dumbwaiters must be enclosed on all sides not used for entrance. Elevator cars upon which an operator is permitted to ride must have no more than one compartment.

(2) Hand elevators having a travel of more than 15 feet must have a car safety, capable of stopping and sustaining the car and rated load. The car safety device need not be operated by a speed governor and may be of the instantaneous type operated as a result of the breaking and slackening of the suspension members.

(3) Hoistway doors for hand-powered elevators must be designed so that they will ensure protection at each landing.

(4) Doors for hand-powered dumbwaiters must be designed so that they will ensure protection at all landings.

(5) Every hoistway door, gate, or entrance of hand elevators and hand dumbwaiters must have conspicuously displayed on the landing side in letters no less than 2 inches high, the words "Danger--Elevator--Keep closed," or "Danger--Dumbwaiter--Keep closed."

Subpart VI

Alterations, Repairs and Maintenance

WAC 296-96-23600 What is the scope of Part VI, Alterations, Repairs and Maintenance?

Subpart VI, Alterations, Repairs and Maintenance, applies to periodic inspections, tests, alterations, and maintenance.

WAC 296-96-23610 What requirements apply to routine periodic inspections and tests?

The owner or the owner's agent must ensure that her/his conveyances are inspected and tested periodically by a person qualified to perform such services, and a report indicating the date of inspection with all pertinent data included must be posted in the machine room unless otherwise specified in ASME A17.1, Part X.

The inspection and tests must be in compliance with the following sections of ASME A17.1, Part X:

- (a) Section 1000, Rule 1000.1, Rule 1000.2, Rule 1000.3;
- (b) Section 1001, Rule 1001.1, Rule 1001.2;
- (c) Section 1002, Rule 1002.1, Rule 1002.2, Rule 1002.3;
- (d) Section 1004, Rule 1004.2;
- (e) Section 1005, Rule 1005.1, Rule 1005.2, Rule 1005.3, Rule 1005.4;
- (f) Section 1007, Rule 1007.2;
- (g) Section 1008, Rule 1008.1, Rule 1008.2; and
- (h) Section 1010, Rule 1010.1, Rule 1010.2, Rule 1010.3, Rule 1010.4, Rule 1010.5, Rule 1010.6, Rule 1010.7.

WAC 296-96-23620 What requirements apply to alterations, repairs and maintenance?

The owner or the owner's agent is responsible for the safe operation, proper maintenance, and alteration of his or her conveyance(s) and must comply with ASME A17.1, Part XII.

WAC 296-96-23630 What requirements apply to elevator equipment displaced by seismic activity?

Any elevator equipment, hydraulic or cable type, that is displaced as a result of seismic activity must be anchored to conform with current standards, when repaired or reanchored to the building.

Subpart VII
Lifts for Physically Handicapped

WAC 296-96-23700 What is the scope of Subpart VII, Lifts for Physically Handicapped?

The department's rules regulating lifting devices for physically handicapped people are described in this subpart.

WAC 296-96-23710 What requirements apply to lifts for the physically handicapped?

Inclined and vertical chairlifts and inclined and vertical wheelchair lifts installed only for use by persons with disabilities in locations other than in or at a private residence must be equipped with a standard electric switch Chicago lock with key #2252. This requirement is in addition to ASME A17.1, Part XX, and the Washington State rules and regulations on barrier-free design.

Subpart VIII
Sidewalk Elevators

WAC 296-96-23800 What is the scope of Subpart VIII, Sidewalk Elevators?

Subpart VIII, Sidewalk Elevators, is a minimum standard for existing power sidewalk elevators.

WAC 296-96-23810 What requirements apply to electrically-operated sidewalk elevators?

Where the top opening is located in the sidewalk or other area exterior to the building, all electrical equipment on the car or in the hoistway must be weatherproof. The operation of power sidewalk elevators through openings in the sidewalk, or through openings in other exterior areas which are protected by hinged doors or vertically lifting covers, must conform to these following requirements:

- (1) The elevator must be operable in both the up and down directions through the opening, only from the sidewalk or other exterior area. The operations must be by means of:
 - (a) Key-operated continuous pressure type, up and down switches; or
 - (b) Continuous pressure type up and down operating buttons on the free end of a detachable, flexible cord five feet or less in length.
 - (c) Continuous pressure type up and down operating buttons may be installed on the elevator car providing the control is so designed that the buttons will not function unless the sidewalk doors are locked in the open position and that a safety screen that will open and close with the car is installed.
- (2) Key-operated switches must be of continuous pressure spring-return type, with the key removable only when the switch is in the off position.